

CALIFORNIA STATE POLYTECHNIC COLLEGE • SAN LUIS OBISPO



GUIDE TO ACADEMIC PROGRAMS

AERONAUTICAL ENGINEERING B.S., 133.

AGRICULTURE M.S., 66.

AGRICULTURAL BUSINESS MANAGEMENT
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SAN LUIS OBISPO



1971 - 72 CATALOG



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ACADEMIC CALENDAR—1971-72

1971

JUNE

S	M	T	W	T	F	S
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JULY

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AUGUST

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SEPTEMBER

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Classes



Examinations

Summer Quarter, 1971

June 30	Wednesday	Registration for summer quarter
July 1	Thursday	Beginning of college year
		Beginning of summer quarter
		Summer quarter classes begin
July 5	Monday	Independence Day—academic holiday
July 8	Thursday	Last day to enroll for summer quarter
		Last day to add courses
July 15	Thursday	Last day to withdraw from classes without penalty
August 19	Thursday	End of seventh week
September 6	Monday	Labor Day—academic holiday
September 8	Wednesday	Last day of classes
September 9	Thursday	Admissions Day—academic holiday
September 10-11-13-14	Friday-Saturday Monday-Tuesday	Final examinations
September 14	Tuesday	End of summer quarter
September 15-19	Wednesday-Sunday	Academic holiday

Fee-Supported Summer Session, 1971

June 14 to First Session	June 18 Second Session	Pre-session.
June 21	July 19	Registration of all students.
June 22	July 20	Summer Sessions classes begin.
June 23	July 21	Last day to enroll for 2-week term.
June 24	July 22	Last day to enroll for 4-week term.
		Last day to add or drop courses without penalty.
July 2	July 30	End of 2-week term.
July 5		Independence Day—academic holiday.
July 17	August 13	End of 4-week term.

Final examinations to be held during the last day of classes.

1971																				
OCTOBER							NOVEMBER							DECEMBER						
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17	18	19	20	21	22	23	21	22	23	24	25	26	27	19	20	21	22	23	24	25
24	25	26	27	28	29	30	28	29	30					26	27	28	29	30	31	
31																				

Fall Quarter, 1971

September 20	Monday	Beginning of fall quarter (faculty only)
September 22	Wednesday	Registration for new students
September 24	Friday	Registration for continuing and returning students
September 27	Monday	Fall quarter classes begin
October 4	Monday	Last day to enroll for fall quarter Last day to add courses
October 11	Monday	Last day to withdraw from classes without penalty
October 25	Monday	Veteran's Day—academic holiday
November 15	Monday	End of seventh week
November 24–27	Wednesday– Saturday	Thanksgiving—academic holiday
December 7	Tuesday	Last day of classes
December 8–11	Wednesday– Saturday	Final examination period
December 11	Saturday	End of fall quarter
December 12– January 2	Sunday– Sunday	Christmas—academic holiday

Winter Quarter, 1972

January 3	Monday	Beginning of winter quarter
January 3–4	Monday– Tuesday	Registration for winter quarter
January 5	Wednesday	Winter quarter classes begin
January 12	Wednesday	Last day to enroll for winter quarter Last day to add courses
January 19	Wednesday	Last day to withdraw from classes without penalty
February 21	Monday	Washington's Birthday—academic holiday
February 23	Wednesday	End of seventh week
March 13	Monday	Last day of classes
March 14–17	Tuesday– Friday	Final examination period
March 17	Friday	End of winter quarter
March 18–22	Saturday– Wednesday	Academic holiday

1972

JANUARY

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FEBRUARY

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APRIL

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MAY

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JUNE

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Spring Quarter, 1972

March 23	Thursday	Beginning of spring quarter
March 23-24	Thursday-Friday	Registration for spring quarter
March 27	Monday	Spring quarter classes begin
March 31	Friday (Noon)	Good Friday—academic holiday
April 3	Monday	Last day to enroll for spring quarter
April 10	Monday	Last day to add courses
April 21	Friday	Last day to withdraw from classes without penalty
April 21	Friday	Last day to apply for June commencement
May 15	Monday	End of seventh week
May 29	Monday	Memorial Day—academic holiday
June 5	Monday	Last day of classes
June 6-9	Tuesday-Friday	Final examination period
June 10	Saturday	Commencement
		End of spring quarter
		End of college year (faculty only)
June 11-30	Sunday-Friday	Academic holiday

JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
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9	10	11	12	13	14	15	13	14	15	16	17	18	19	10	11	12	13	14	15	16
16	17	18	19	20	21	22	20	21	22	23	24	25	26	17	18	19	20	21	22	23
23	24	25	26	27	28	29	27	28	29	30	31			24	25	26	27	28	29	30
30	31																			

Tentative Summer Quarter, 1972

July 1	Saturday	Registration for summer quarter Beginning of college year Beginning of summer quarter
July 3	Monday	Summer quarter classes begin
July 4	Tuesday	Independence Day—academic holiday
July 10	Monday	Last day to enroll for summer quarter Last day to add courses
July 17	Monday	Last day to withdraw from classes without penalty
August 21	Monday	End of seventh week
September 4	Monday	Labor Day—academic holiday
September 8	Friday	Last day of classes
September 11–14	Monday– Thursday	Final examination period
September 14	Thursday	End of summer quarter
September 15–17	Friday– Sunday	Academic holiday

Tentative Fee-Supported Summer Sessions, 1972

June 12 to June 16.....	Pre-session.	
First Session	Second Session	
June 19	July 17.....	Registration of all students.
June 20	July 18.....	Summer Sessions classes begin.
June 21	July 19.....	Last day to enroll for 2-week term.
June 22	July 20.....	Last day to enroll for 4-week term.
		Last day to add or drop courses without penalty.
June 30	July 28.....	End of 2-week term.
July 4		Independence Day—academic holiday.
July 15	August 11.....	End of 4-week term.
Final examinations to be held during the last day of classes.		



THE CALIFORNIA STATE COLLEGES

Academic year 1971-72 marks for the California State Colleges the beginning of their second decade of service to the people of California as a unified system of public higher education—the largest such system in the Western Hemisphere and one of the largest in the world. Brought together as a system under an independent Board of Trustees as a result of the Donahoe Higher Education Act in the early 1960's, the California State Colleges now number nineteen, covering the state from Humboldt State College in the north to San Diego State College in the south. Current enrollment exceeds 244,000 full- and part-time students, with a faculty of approximately 14,000.

Responsibility for the California State Colleges is vested in the Board of Trustees, whose members are appointed by the Governor, and the Chancellor, who is the executive officer of the system. The Trustees and the Chancellor develop system-wide policy, with implementation taking place at the campus level. The Academic Senate of the California State Colleges, made up of elected representatives of the faculty from each college, recommends academic policy to the Board of Trustees through the Chancellor.

Each college in the system has its own unique geographic and curricular character. Programs leading to the bachelor's and master's degrees are master-planned to anticipate and accommodate student interest and the educational and professional needs of the State of California. Although there is increasing recognition of the importance of research to the maintenance of quality teaching, the primary responsibility of the faculty continues to be the instructional process.

While San Jose State College, the oldest, was founded over a century ago, prior to World War II only seven State Colleges were in existence, with a total enrollment of 13,000. Since 1947, twelve new colleges have been established, and sites have been selected for additional campuses in Ventura, San Mateo, and Contra Costa counties. California State College, Bakersfield, the newest, was opened to students only last year. Enrollment in the system is expected to pass 400,000 by 1980.

ADMINISTRATION, CALIFORNIA STATE COLLEGES

EX OFFICIO TRUSTEES

Hon. Ronald Reagan	State Capitol, Sacramento 95814
Governor of California and President of the Trustees	
Hon. Ed Reinecke	State Capitol, Sacramento 95814
Lieutenant Governor of California	
Hon. Bob Moretti	State Capitol, Sacramento 95814
Speaker of the Assembly	
Hon. Wilson Riles	721 Capitol Mall, Sacramento 95814
State Superintendent of Public Instruction	
Dr. Glenn S. Dumke	5670 Wilshire Blvd., Los Angeles 90036
Chancellor of the California State Colleges	

APPOINTED TRUSTEES

Appointments are for a term of eight years and expire March 1 of the years indicated in parentheses. Names are listed in order of accession to the board.

Charles Luckman, LL.D., A.F.D. (1974)	9220 Sunset Blvd., Los Angeles 90069
Theodore Meriam, A.B. (1971)	P.O. Box 370, Chico 95926
Albert J. Ruffo, LL.B., B.S. in E.E. (1971)	675 N. First Street, Suite 1200, San Jose 95112
Mrs. Philip Conley, B.A. (1972)	3729 Huntington Blvd., Fresno 93702
E. Guy Warren, B.A. (1973)	P.O. Box 59, Hayward 94541
Daniel H. Ridder, B.A. (1975)	604 Pine Ave., Long Beach 90801
George D. Hart, A.B. (1975)	111 Sutter St., San Francisco 94104
Alec L. Cory, B.A., LL.B. (1973)	530 B St., Suite 1900, San Diego 92101
William A. Norris, A.B., LL.B. (1972)	609 So. Grand, Los Angeles 90017
Edward O. Lee, B.A. (1974)	P.O. Box 23361, Oakland 94623
Dudley Swim, A.B., M.A. (1976)	Rt. 2, Box 5000, Carmel 93924
Karl L. Wente, M.S. (1976)	5565 Tesla Rd., Livermore 94550
William O. Weissich, B.S., J.D. (1977)	1299 Fourth St., San Rafael 94901
Robert A. Hornby, LL.D. (1978)	P.O. Box 60043, T.A. Los Angeles 90060
Mrs. Louis Lancaster, B.S., M.A. (1977)	P.O. Drawer JJ, Santa Barbara 93102
Gene Benedetti, B.A. (1978)	P.O. Box 950, Petaluma 94952
William F. McColl, M.A., M.D. (1979)	1433 Merced Ave., West Covina 91790
Wendell W. Witter, A.B. (1979)	45 Montgomery St., San Francisco 94106

OFFICERS OF THE TRUSTEES

Governor Ronald Reagan	E. Guy Warren
President	Chairman
Alec L. Cory	Chancellor Glenn S. Dumke
Vice-Chairman	Secretary-Treasurer

Office of the Chancellor	5670 Wilshire Boulevard
The California State Colleges	Los Angeles, California 90036
Glenn S. Dumke	Chancellor
H. E. Brakebill	Executive Vice Chancellor
Norman Epstein	Vice Chancellor and General Counsel
D. Dale Hanner	Vice Chancellor, Business Affairs
Harry Harmon	Vice Chancellor, Physical Planning and Development
C. Mansel Keene	Assistant Chancellor, Faculty and Staff Affairs
William B. Langsdorf	Vice Chancellor, Academic Affairs

THE CALIFORNIA STATE COLLEGES

San Jose State College (1857)..... 125 South Seventh Street, San Jose, California	John H. Bunzel, President 95114
Chico State College (1887)..... First and Normal Streets, Chico, California	Stanford Cazier, President 95926
San Diego State College (1897)..... 5402 College Avenue, San Diego, California	Malcolm A. Love, President 92115
San Francisco State College (1899)..... 1600 Holloway Avenue, San Francisco, California	S. I. Hayakawa, President 94132
California State Polytechnic College (1901)..... San Luis Obispo, California	Robert E. Kennedy, President 93401
Fresno State College (1910)..... Shaw and Cedar Avenues, Fresno, California	Norman A. Baxter, President 93726
Humboldt State College (1913)..... Arcata, California	Cornelius H. Siemens, President 95521
California State Polytechnic College (1938) Kellogg-Voorhis..... 3801 West Temple Avenue, Pomona, California	Robert C. Kramer, President 91766
California State College, Los Angeles (1947)..... 5151 State College Drive, Los Angeles, California	John A. Greenlee, President 90032
Sacramento State College (1947)..... 6000 Jay Street, Sacramento, California	Bernard L. Hyink, President 95819
California State College, Long Beach (1949)..... 6101 East 7th Street, Long Beach, California	Stephen Horn, President 90801
California State College, Fullerton (1957)..... 800 North State College Boulevard, Fullerton, California	L. Donald Shields, President 92631
California State College, Hayward (1957)..... 25800 Hillary Street, Hayward, California	Ellis E. McCune, President 94542
San Fernando Valley State College (1958)..... 18111 Nordhoff Street, Northridge, California	James W. Cleary, President 91324
Stanislaus State College (1959)..... 800 Monte Vista Avenue, Turlock, California	Carl Gatlin, President 95380
Sonoma State College (1960)..... 1801 East Cotati Avenue, Rohnert Park, California	Thomas H. McGrath, President 94928
California State College, Dominguez Hills (1960)..... 1000 E. Victoria Street, Dominguez Hills, California	Leo F. Cain, President 90247
California State College, San Bernardino (1960)..... 5500 State College Parkway, San Bernardino, California	John M. Pfau, President 92407
California State College, Bakersfield (1967)..... 9001 Stockdale Highway, Bakersfield, California	Paul F. Romberg, President 93309

**ENROLLMENT AT CALIFORNIA STATE POLYTECHNIC COLLEGE
SAN LUIS OBISPO, FALL QUARTER 1970-71**

Major Curriculum	Men	Women	Total
School of Agriculture and Natural Resources			
Ag. Business Management.....	387	77	464
Ag. Engineering.....	88	1	89
Animal Science.....	325	178	503
Crops Science.....	118	6	124
Dairy Science.....	96	23	119
Farm Management.....	150	11	161
Food Industries.....	58	41	99
Fruit Science.....	34	6	40
Mechanized Ag.....	141	3	144
Natural Resources Mgt.....	142	19	161
Ornamental Horticulture.....	177	66	243
Poultry Industry.....	51	5	56
Soil Science.....	75	19	94
Totals.....	1,842	455	2,297
School of Architecture and Environmental Design			
Architecture.....	1,202	33	1,235
Architectural Engineering.....	75	0	75
City and Regional Planning.....	86	5	91
Totals.....	1,363	38	1,401
School of Business and Social Sciences			
Business Administration.....	709	139	848
Social Sciences.....	222	421	643
Totals.....	931	560	1,491
School of Communicative Arts and Humanities			
English.....	54	277	331
Graphic Communications.....	173	14	187
History.....	100	116	216
Journalism.....	56	63	119
Speech.....	24	28	52
Totals.....	407	498	905
School of Engineering and Technology			
Aeronautical.....	305	5	310
Electrical.....	148	1	149
Electronic.....	651	2	653
Engineering Technology.....	325	0	325
Environmental.....	118	5	123
Industrial.....	132	2	134
Industrial Technology.....	326	2	328
Mechanical.....	403	3	406
Metallurgical.....	56	0	56
Transportation.....	53	4	57
Totals.....	2,517	24	2,541

**ENROLLMENT AT CALIFORNIA STATE POLYTECHNIC COLLEGE
SAN LUIS OBISPO, FALL QUARTER 1970-71—Continued**

Major Curriculum	Men	Women	Total
School of Human Development and Education			
Child Development.....	2	266	268
Home Economics.....	3	676	679
Men's Physical Education.....	299	0	299
Women's Physical Education.....	0	145	145
Totals.....	304	1,087	1,391
School of Science and Mathematics			
Biochemistry.....	62	35	97
Biological Sciences.....	250	191	441
Chemistry.....	72	10	82
Computer Science.....	179	36	215
Mathematics.....	313	162	475
Physics.....	67	7	74
Totals.....	943	441	1,384
Graduates.....	535	441	976
College totals.....	8,842	3,544	12,386

GENERAL INFORMATION

EDUCATION AT CAL POLY

As one of the 19 colleges in the State College System, California State Polytechnic College, San Luis Obispo, offers educational programs in agriculture, applied arts, applied sciences, architecture, engineering, and preparation for elementary and secondary school teaching. Historically, Cal Poly's method of education and dedication to occupational-centered curricula has created for the College a distinctive role in higher education in California. The College is particularly noted for its emphasis on agriculture, business, engineering, and home economics, together with the closely-related supporting fields of natural sciences, physical sciences, and mathematics.

Although the basic purpose of the College is to prepare students to meet the requirements of specific occupations, it is also dedicated to helping the individual to achieve his or her maximum personal development. Each student pursues a program of required general education courses, and through an extensive co-curricular program receives an opportunity to combine specialized instruction with preparation for citizenship, leadership, and constructive community living. Students are also encouraged to obtain actual experience through individual and group projects, work-study programs, and internships. Faculty members, who are selected on the basis of academic qualifications, professional experience, and teaching ability, are encouraged to maintain a constant interplay between general principles and practical applications in all instruction, whether in the laboratory, classroom or field study.

In each program in the College, the student begins work in the major field of his choice during the freshman year. A concurrent sequence of general education and elective courses assists the student in relating this chosen area of study to other fields of knowledge. Practical educational experiences in the major field prepare the student for specific occupations and professions or advanced study. Additional details of curricula appear in the sections describing each school and department. Student and faculty participation in the development and improvement of both curricular and co-curricular programs characterizes the College's mode of operation.

HISTORICAL DEVELOPMENT

California State Polytechnic College began with the establishment in 1901 by the State Legislature of a vocational high school at San Luis Obispo. The institution served as a forerunner in vocational education for agriculture and industry in California. In 1921 its Board of Trustees was dissolved and the State Board of Education administered the school until July 1, 1961 when administration passed to the Trustees of the California State Colleges.

Cal Poly began offering junior college courses in 1927, and became a two- and three-year institution in 1933. In 1936 a degree transfer program was added, and in 1940 the first bachelor of science degrees were authorized.

The first baccalaureate exercises were held in 1942. Approval to grant the master of arts degree in education was received in 1949, and to grant the master of science degree in 1967.

From 1933 until his retirement in 1966, the late Dr. Julian A. McPhee was chief administrator of Cal Poly. On May 1, 1967 the Trustees of the California State Colleges named Dr. Robert E. Kennedy as president of Cal Poly.

Approximately 12,000 students are enrolled in the College in some 50 academic programs. Included are men and women students from 58 California counties, 42 of the 50 states, and 65 foreign countries.

The future growth of the College to an enrollment in excess of 12,000 is provided for by master plans for both academic and physical development approved by the Trustees. Support of the College by the people of California through the Legislature and the Trustees insures the continuation of a distinctive polytechnic program in higher education.

THE CAMPUS

The Cal Poly campus consists of over 5,000 acres adjacent to San Luis Obispo, a community of 30,000 located on U.S. Highway 101, midway between San Francisco and Los Angeles, and 12 miles from the beaches and marine facilities of California's Central Coast.

Due to the varied nature of the College's curricula, instructional facilities are diverse and suited to the up-to-date demands of modern technology. In addition to faculty offices, classrooms, and laboratories for instructional use, the College is served by several specialized facilities, particularly in agriculture, architecture, engineering, and the sciences.

Cal Poly has long been known as a friendly college which welcomes visitors to its campus. Maps suitable for a self-conducted tour are available from the information desk of the Administration Building for interested prospective students and parents and others. In addition, the College provides three educational tours for which printed guides are available. These include a campus tree walk, dairy tour, and a tour of the unique Shakespeare Press Museum. Arrangements for group visits to the campus may be made by contacting the Director, Information Services and/or the office of the dean of the respective academic school.

INSTRUCTIONAL FACILITIES

The outstanding agricultural programs of the College utilize such facilities as the Alan A. Erhart Agriculture building (which includes modern laboratories for animal husbandry, accounting, crops, dairy, farm management, and ornamental horticulture); several Agricultural Engineering shops (including farm mechanics, farm machinery, farm power, hydrology, rural electricity); the Food Processing building (which includes a creamery, meat laboratory, canning and freezing laboratories, and an instructional retail facility); soil science and veterinary science laboratories in the Science building; and an unexcelled complex of agricultural production units which are utilized instructionally in the College's student enterprise projects.

These agricultural units include a beef unit with feeding barns; 3800 acres of cattle range and pasture; a judging pavilion; a complete feed mill with storage facilities; a crops unit which includes washing, crating, and packing areas; and 750 acres of vegetable and field crops plus 30 acres of fruit and vine crops. Dairy unit includes a milking barn, feed barns, judging pavilion, and a complete creamery. In addition, a student project unit provides for 80 head of student-owned dairy project cattle. The horse unit includes barns, paddocks, and pasture for thoroughbred and quarter horses. A recently completed ornamental horticulture unit provides the most modern propagation and instructional facilities of their kind in the nation. Additional agricultural units are utilized instructionally for sheep, swine, and poultry production.

The instructional philosophy of the college as reflected in the extensive and modern agricultural facilities has also been incorporated in programs of engineering and technology, science, mathematics, graphic communications, physical education, home economics, and other areas in which Cal Poly has developed a reputation for excellence. These include laboratories for all phases of engineering such as aeronautical, electronic, environmental and industrial, mechanical, welding technology, and engineering technology.

A new computer science building provides computer capabilities for all instructional programs, particularly those in engineering, science, and mathematics. Two large science buildings provide fully equipped laboratories devoted to instruction in bacteriology, botany, chemistry, entomology, marine biology, microbiology, physics, plant pathology, and zoology.

Individual drafting and study cubicles in architectural laboratories give a distinctive appearance to new drafting classrooms as well as to some of the college's historical buildings which have been remodeled by the students themselves to provide design facilities in the School of Architecture and Environmental Design.

In addition to a 500-seat theater, a language laboratory, home economics and child development laboratories, college facilities include a live-in home management house. The graphic arts building, which houses the journalism program, student newspaper, and radio station, includes the graphic communications depart-

The Campus

ment which ranges from the unique Shakespeare Press Museum to the most modern computer typesetting equipment for printing instruction.

The physical education facilities of the college are extensive. The men's gymnasium provides boxing, wrestling, and gymnastic rooms in addition to the main floor which contains three full-length cross-court basketball courts and seats 4,000 persons for athletic contests. Handball and tennis courts are adjacent to the gymnasium, along with a large playing field area for intramural sports and physical education classes. Two heated swimming pools are used both for physical education classes and for varsity water polo and swimming. The football stadium has a grandstand and bleachers seating 5,500 persons. There is also a spacious baseball field with permanent seating, and a 9-lane all-weather quarter-mile track. There is also a women's physical education building utilized for minor sports as well as for special women's physical education requirements.

The College's four-story Administration building and Julian A. McPhee College Union serve all college personnel.

The program of the Walter F. Dexter Library is designed to meet the curricular resource needs of students and the instructional and research needs of the faculty. The collections in excess of 800,000 cataloged and unclassified items include 300,000 cataloged volumes, approximately 25,000 bound periodicals, 275,000 microforms, and 200,000 unbound documents, pamphlets, and miscellaneous materials. The Library receives regularly 2,400 periodical and 2,500 other serial titles, and it is an official depository for United States Government and California State publications. Bookstacks located throughout the Library are open to all readers, and professionally trained librarians assist students and faculty in the use of the Library's resources.

STUDENT SERVICES FACILITIES

On-campus Housing

Approximately 2,150 students are housed in twelve permanent residence halls. About one-third of these spaces are for women students. The newer halls provide space for study areas, recreation, television lounges, and laundry facilities.

Family Housing

The Housing Office maintains lists of available apartments, houses, and facilities in the area suitable for married students.

Dining Hall

A modern dining hall provides a variety of food services consisting of complete meals, a la carte cafeteria, a snack bar, and vending service.

Health Center

The student Health Center is a well-equipped clinic and infirmary.

College Union

The Julian A. McPhee College Union is the center of campus social, cultural, and recreational activities. It includes restful lounges, conference and work rooms, student council chambers, program planning offices, billiards and bowling, craft shops, and food service. It also adjoins the new El Corral Bookstore.

ACCREDITATION

The College is fully approved as a four-year degree-granting institution by the Western Association of Schools and Colleges (formerly Western College Association). In addition the College holds associate membership in the Northwest Association of Secondary and Higher Schools.

The Chemistry Department is fully approved and accredited by the American Chemical Society and students completing the appropriate curriculum are eligible for certification by the Society. The five-year curriculum leading to the Bachelor of Architecture degree in the School of Architecture is fully accredited by the National Architectural Accrediting Board.

Five curricula in the School of Engineering and Technology are accredited by the Engineers Council for Professional Development. They are: Aeronautical Engineering, Electrical Engineering, Electronic Engineering, Industrial Engineering, and Mechanical Engineering.

SPECIAL INSTRUCTIONAL SERVICES

INSERVICE TRAINING IN AGRICULTURE

The College plays an active role in the inservice training of teachers of vocational agriculture by providing instructional staff and facilities for workshops and training programs co-operatively sponsored by the College and the State Bureau of Agricultural Education.

The College provides an annual one-week summer skills program. The content varies, depending upon the needs and desires of the teachers as these are expressed through the Bureau of Agricultural Education. College staff members provide up-to-date training in the technical phases of agriculture and also contribute to the professional improvement of teachers by offering instruction in teaching methods.

The annual summer conference of the California Agricultural Teachers Association is held at the College with an attendance of 400-500 persons. Facilities, special speakers, exhibits, and other services are provided by the College.

SERVICES TO VOCATIONAL AGRICULTURE

Services to vocational agriculture departments in the secondary schools of California are provided by the College staff through such activities as: visiting vocational agriculture departments to discuss with teachers and students dairy, animal husbandry, deciduous and citrus fruits, field and truck crops, poultry, farm mechanics, farm management, and other problems; writing for agricultural magazines; assisting high school vocational agriculture departments to solve educational and agricultural problems through correspondence; judging of livestock, poultry, crops and other products at fairs; furnishing of breeding stock and hatching eggs to improve herds and flocks owned by Future Farmers throughout the State; and preparing a variety of teaching aids. These services are provided by the College through a co-operative arrangement with the Bureau of Agricultural Education.

Other services to vocational agriculture are rendered by the Instructional Materials Program sponsored by the College to create a variety of visual aids for educational use.

SUMMER SESSIONS

The summer sessions are designed to meet the needs of regularly enrolled and visiting students and of teachers and others who wish to improve their professional competence. The College conducts two four-week summer sessions and a one-week pre-session. The course offerings are broad, leading to various degrees and credentials, as well as providing for continuing professional development in many fields.

Admission to the summer sessions does not require completion of the matriculation process. Registration in the summer session does not insure the privilege of enrollment in one of the regular quarters. Graduate students should consult the *Graduate Study Bulletin* regarding requirements for classified status and applicability of credit toward their degree objectives.

The summer sessions are supported by fees collected from the students who enroll in the courses. There is no application fee for summer sessions. Requests for application forms, information on course offerings and regulations should be addressed to the Associate Dean, Continuing Education.

EXTENSION PROGRAM

The college offers a variety of extension courses to assist in meeting the educational needs of the residents of its extension service area (San Luis Obispo, Santa Barbara, and southern Monterey Counties). Courses are arranged in an area when student demand is adequate to finance the instruction. Extension program offerings may be full quarter classes or special interest seminars or workshops of shorter duration.

Prospective extension students need not apply for admission to the college. Enrollment in an extension course does not imply admission to the college as a matriculated student for any quarter.

Instructional Services

The maximum extension credit which may be accepted towards the bachelor's degree is 36 quarter units, not more than 18 of which may be transferred from another institution. No more than 9 quarter units of extension work may be counted towards the master's degree.



SHORT COURSE AND WORKSHOP PROGRAMS

The College makes its facilities and instructional staff available for programs of special design appropriate to its education objectives. These professional short courses, workshops and conferences have included such titles as: Physical Education Workshop; American Institute of Floral Design Symposium; American Society for Engineering Education Mid-Year Conference; American Association of Physics Teachers Regional Conference; Multi-County Workshop for Teachers of Migratory Children; California Nurserymen's Refresher Course, San Luis Obispo County Development Association Conference; FFA Conference; California Mathematics Council Conference.

EDUCATIONAL OPPORTUNITY PROGRAM

The college participates in the Educational Opportunity Program jointly sponsored by Federal and State agencies for residents of California. Designed to help minority and low income students obtain a college education, it provides financial assistance, tutoring, curriculum advisement, counseling, and vocational guidance services. This College's program is especially attractive to students interested in its vocational and technical departments. California State College entrance requirements may be waived for a limited number of high school graduates and college transfers. Agencies authorized to nominate students for the program include high schools, community colleges, the Veterans Administration, and certain State agencies. For more information contact the Educational Opportunity Program Office.

INTERNATIONAL EDUCATION

The College is involved in a number of International Education programs, both on-campus and overseas. In addition to participating in the California State College systemwide study abroad program, the College provides technical assistance overseas through a contractual relationship with the Agency for International Development, U.S. Department of State. The College has several such projects in areas of the world including Guatemala, Thailand, and Botswana, Lesotho and Swaziland (South Africa). The College also provides on-campus training to students from foreign countries through an AID participant training contract. The college operates a Peace Corps Intern program for Thailand which provides senior and graduate students an opportunity to obtain their pre-Peace Corps training on campus while completing their degree requirements.

STUDY ABROAD

California State Polytechnic College students who qualify may participate in academic year programs of study at a number of distinguished universities abroad.

Cooperating universities abroad include the University of Aix-Marseille, France; the Free University of Berlin and the University of Heidelberg, Germany; University of Athens, Greece; the University of Florence, Italy; the University of Coimbra and the University of Lisbon, Portugal; the University of Stockholm and the University of Uppsala, Sweden; the University of Copenhagen, Denmark; the University of Madrid and the University of Granada, Spain; the State University of Leningrad, U.S.S.R.; Tel Aviv University and the Hebrew University of Jerusalem, Israel; the American University of Beirut, Lebanon; Waseda University, Japan; National Chengchi University, Taiwan; Andhra University and the Universities of Benares and Delhi, India; the Catholic University, Peru. In the United Kingdom, cooperating universities, which may vary from year to year, have included Birmingham, Bristol, Dundee, Exeter, Leicester, Liverpool, London, Nottingham, Oxford, Sheffield, Southampton and Wales. Cooperative arrangements also exist with the Netherlands School of Business, Netherlands, and the Centro de Estudios Universitarios Colombo-Americano (CEUCA), Colombia, and study opportunities are offered in Ghana, Africa. Academic work successfully completed at the cooperating universities abroad may be applied toward the degree requirements of the College in accordance with its regulations.

Students are selected on the basis of academic, linguistic and personal qualifications. The criteria are:

- a) Upper division or graduate standing by the beginning of the academic year abroad;
- b) Academic achievement;
- c) Proficiency in the language of instruction;
- d) Faculty recommendations.

Cost to the student ranges from \$2,000 to \$2,500 and includes round-trip transportation from San Francisco to the study centers, room and board for the academic year, and health and accident insurance. For 1971-72, these costs are: Taiwan, \$2,000; France, Germany, Ghana, Portugal, Spain, \$2,200; Colombia, Israel, Lebanon, Peru, U.S.S.R., \$2,300; Italy, Japan, \$2,400; Denmark, Greece, India, Netherlands, Sweden, United Kingdom, \$2,500. Students remain eligible for any financial aids available at the college, and payments may be made in installments over the year.

Proficiency in the language of the host country is a requirement for the programs in France, Germany, Latin America, Portugal, Spain and the U.S.S.R. Ordinarily, two years of college-level study of the language, or the equivalent, will satisfy this requirement. In the U.S.S.R., however, three years language study is mandatory. Even where language proficiency is not required, however, competence in the language of the host country will assure broader curricular opportunities.

Application for the 1972-73 academic year should be made early in the Fall of 1971. Detailed information may be obtained at the International Education Office, or by writing to the Office of International Programs, The California State Colleges, 1600 Holloway Avenue, San Francisco, Calif. 94132.

THE FOUNDATION

In 1940 a nonprofit corporation known as the California State Polytechnic College Foundation was organized. With faculty and administrative personnel as directors, the foundation has assumed the responsibility for financing and recording the project operations, operating and managing the cafeterias and housing facilities, and providing other services to students.

The foundation operates under lease agreements made with the Trustees of the California State Colleges and approved by the State Department of Finance. The provisions of these leases define the activities of the foundation and the use of its funds. The accounts are audited by the Department of Finance.

Through the foundation there is available a revolving fund from which students may borrow to finance their projects. No cosigner is required for a student to borrow from the foundation, but he must present a working plan, a budget, and a signed contract with the foundation before starting a project. Each student contributes a share from his earnings towards the project fund. Any losses in student projects are covered by the foundation from the fund contributed by project operators.

Typical agricultural projects include: Fattening steers, lambs, or swine; raising and breeding cattle, both beef and dairy, for a start towards future herds; growing crop projects, such as tomatoes, sweet corn, hay, and sugar beets; raising poultry, both meat birds and laying hens, and operating the hatchery; growing and marketing ornamental horticulture projects.

Engineering departments also conduct group projects.

THE ALUMNI ASSOCIATION

California State Polytechnic College San Luis Obispo, is the official headquarters of the Alumni Association, comprised of almost 3,000 former students and graduates as life members of the Association and an additional 1,000 annual members. The governing board of the Association consists of 16 sectional directors who provide representation throughout the State of California. In addition to the board of directors, a president and two vice presidents elected from among the directors serve two-year terms. Vice presidents direct the activities of northern and southern regions of the state, respectively. Other officers are the secretary-treasurer and the alumni director.

The Alumni Association strives to work for the best interest of the College in areas needing support. In addition, the Association maintains a graduate mailing list and supports the College in publishing a bi-monthly newspaper for graduates and former students.

The Cal Poly Alumni Association also grants yearly scholarships to worthy students and provides a short term loan fund for those needing temporary assistance.

ADMISSIONS AND REGISTRATION





ADMISSION REQUIREMENTS

Admission to California State Polytechnic College is open to qualified graduates of any high school and to other applicants who, in the judgment of the appropriate college authorities, possess equivalent preparation. Admission is limited to those students for whom adequate staff and facilities are available.

Guidance tests which are completed by incoming students are a part of the matriculation process and are given for the purpose of providing information for the student, his departmental adviser, and the counseling center. The departmental adviser uses guidance test results to assist in determining the courses most suited to the student's needs. These tests are not entrance examinations.

At the time of admission to the College all students are accepted into a specific major field of study. To conform to admission requirements, every student must submit an application for admission and two copies each of transcripts of previous high school and college training, including available test data. See also under "Matriculation."

Students may elect to be absent any one quarter without filing an application for readmission.

Transcripts and records presented for admission or evaluation will remain in the student's folder as a part of his permanent record upon completion of registration.

Transfer Credit and Residence Requirements

Persons who have attended junior colleges or four-year colleges will be given full credit for such college level courses as may be applicable to the pattern of course work in the California State Polytechnic College curriculum followed, and in general elective credit for those not so applicable. Credit earned in non-accredited colleges and universities will be accepted toward graduation requirements only after the student has completed 36 quarter units in residence with a C average.

Not more than 70 semester units (105 quarter units) may be allowed for credit taken in a junior college. No credit may be allowed for professional courses in education taken in a junior college.

A maximum of 36 quarter units of extension course credit may be applied toward the bachelor's degree. Not more than 18 quarter units of this may be transferred from another institution.

No limit is placed upon the number of transferable credits from a four-year college or university, except that no student will be granted a bachelor's degree in any of the various curricula with less than 50 quarter units in residence at least 30 of which must be among the last 40 units counted toward the degree.

Individuals transferring from colleges or universities will be considered for admission only on a conditional basis at California State Polytechnic College if they have been on probation at the college or university last attended.

Evaluation of in-service military training will be made on the basis of American Council on Education recommendations.

Application Procedure and Filing Dates for Admission or Readmission to the College

All prospective students must file a completed application for admission within the appropriate filing period. The completed application includes the application form, the California State College Residence Questionnaire, and the non-refundable application fee of \$20.00. Each applicant may file only one application for any one term within the California State College system. The application should be obtained from, and filed with, the college of first choice. Second, third, and fourth choice campuses should be listed on the application. All applications received after the filing periods will be processed as late applications.

<i>Filing Period</i>	
Summer quarter, 1972.....	January 3-31, 1972
Fall quarter, 1972.....	November 1-30, 1971
Winter quarter, 1973.....	June 1-30, 1972
Spring Quarter, 1973.....	August 1-31, 1972

Admissions

Space Reservations

All applications received during the initial filing period will receive equal consideration within the College's established enrollment categories and quotas, irrespective of the time and date they are received.

Applicants who can be accommodated within enrollment quotas will receive confirmation of space reservation. Although the space reservation is not a statement of admission, it is a commitment on the part of the College to admit a student once eligibility has been determined. When the student receives notice of the space reservation, he should initiate action to have transcripts of any college and high school work sent to the College. The College will inform him of the number of copies of transcripts required, dates for submittal, and where they should be sent. *The student should not request that transcripts be sent until requested to do so by the college where space has been reserved.*

Applications of students who cannot be accommodated will automatically be forwarded to their second choice, and, if they cannot be accommodated there, to their third and fourth choice college.

The College has established procedures to consider qualified applicants who would be faced with an extreme hardship if not admitted.

REQUIREMENTS FOR ADMISSION AS AN UNDERGRADUATE STUDENT

Requirements for admission to California State Polytechnic College are in accordance with Title 5, Chapter 5, Subchapter 2 of the California Administrative Code. A prospective applicant who is unsure of his status under these requirements is encouraged to consult with a school or college counselor or contact the College admissions office. Students registered for less than a full load are subject to the same admission requirements as regular students. See also under "Matriculation."

It is not always possible for the college to accommodate all qualified applicants. When there is lack of facilities or qualified faculty to accommodate students applying for admission to a specified curriculum, the applicant will be notified of that fact and will be informed of alternatives open to him at that time.

ADMISSION AS A FRESHMAN

An applicant who has had no college work will be considered for admission under one of the following provisions. Except as noted, applicants for admission should complete and submit the results of the American College Test (ACT). Scores on the College Entrance Examination Board, Scholastic Aptitude Test (SAT) will also be accepted but the former test is preferred.

California High School Graduates and Residents

An applicant who is a graduate of a California high school or a legal resident for tuition purposes must have a grade point average and total or composite score on the appropriate aptitude test which results in an eligibility index* placing him among the upper one-third of California high school graduates. The grade point average is based upon all high school work taken, excluding work completed in the freshman year as well as any courses in physical education or military science. The table below does not cover every case, but gives several examples of the test score needed with a given grade point average to be eligible for admission. The minimum eligibility index is ACT-741 or SAT-3072.

Grade Point Average	Minimum ACT Score	Minimum SAT Score
3.21 and above	Eligible with any score	
2.80	19	832
2.40	27	1,152
2.00	35	1,472
1.99 and below	Not eligible	

Non-Residents Graduated from High Schools in Other States or Possessions

An applicant who is a non-resident for tuition purposes and who is a graduate of a high school in another state or a U.S. possession must have an eligibility index* which would place him among the upper one-sixth of California high school graduates. The minimum required eligibility index is SAT-3402 or ACT-826.

Graduates of High Schools in a Foreign Country

An applicant who is a graduate of a foreign high school must have preparation equivalent to that required of eligible California high school graduates. The college will carefully review the previous record of all such applicants and only those with promise of academic success equivalent to that of eligible California high school graduates will be admitted. Such applicants are not required to take the SAT or ACT test.

Non-High School Graduates

An applicant who is over 21 years of age, but has not graduated from high school will be considered for admission only when his preparation in all other ways is such that the college believes his promise of academic success is equivalent to that of eligible California high school graduates.

Admission to Two-Year Technical Curricula in Agriculture

Admission to two-year technical curricula in agriculture is available to high school graduates whose preparation and educational objectives are appropriate to the programs offered as determined by appropriate college authorities.

Other Applicants

An applicant not admissible under one of the above provisions should enroll in a community college or other appropriate institution. Only under the most unusual circumstances will such applicants be permitted to enroll in the college. Permission is granted only by special action.

Recommended Preparation

Overall excellence of performance in high school subjects and evidence of academic potential provide the basis for admission to California State Polytechnic College. While no course pattern is required, the applicant to be properly prepared to undertake a full program of studies and to pursue the required program in general education is strongly encouraged to include the following subjects as minimally adequate background for college work:

1. College preparatory English.
2. Foreign language.
3. College preparatory mathematics.
4. College preparatory laboratory science.
5. College preparatory history and/or social science.
6. Study in speech, music, art, and other subjects contributing to general academic background.

* The eligibility index is computed by multiplying the grade point average by 800 and adding it to the total SAT score or by multiplying the grade point average by 200 and adding it to 10 times the composite ACT score.



Admissions

ADMISSION AS AN UNDERGRADUATE TRANSFER

Any applicant who has attempted college work will be considered for admission under one of the following provisions. Applicants for admission who have not completed 60 semester units (90 quarter units) with a 2.0 (C) grade average should complete and submit the results of either the College Entrance Examination Board Scholastic Aptitude Test (SAT) or the American College Test (ACT).

Applicants with 60 or More Semester Units (90 Quarter Units)

An applicant who has completed 60 or more semester units or the equivalent may be admitted if he meets both of the following conditions. High school transcript and SAT or ACT results are not required.

1. He has attained a grade point average in all college work attempted of 2.0 (C) if he is a California resident or 2.4 (five-point scale) if he is not a California resident.
2. He was in good standing at the last college attended.

Applicants with Fewer Than 60 Semester Units (90 Quarter Units)

An applicant who has completed fewer than 60 semester units or the equivalent may be admitted if he meets the above scholarship and good standing requirements and he meets requirements currently in effect for first-time freshmen or, if he has been in full-time continuous enrollment at a college since his graduation from high school, he meets the requirements in effect for first-time freshmen at the time of his high school graduation. Requires submission of high school transcript and either SAT or ACT results.

Applicants with Particular Majors

An applicant who does not meet either of the above provisions may be admitted to the college if his desired major is such that 60 semester units of work appropriate to that major are not offered by the institution from which he seeks to transfer, and if he meets all of the following:

1. He has completed all appropriate course work offered.
2. He has attained a grade point average of 2.0 (C) in all college work attempted.
3. He was in good standing at the last college attended.
4. He can, in the judgment of the college, succeed in that degree objective.

Other Applicants

Only under the most unusual circumstances will an applicant not meeting either of the above provisions be considered for admission. Permission is granted by special college action.

ADMISSION FROM SCHOOLS AND COLLEGES IN FOREIGN COUNTRIES

The admission of international (foreign) students is governed by separate requirements. The official transcript of record and other credentials of an applicant for admission from a foreign country should be submitted in official English language translation. All application papers should be submitted to the Admissions Office in accordance with the published filing periods. Inquiries concerning admission should be made early enough to allow sufficient time for the necessary correspondence relative to admission. This will aid the applicant in obtaining the necessary travel documents.

An applicant from a foreign country whose education has not been conducted in the English language may be admitted only after demonstrating that his command of the language will permit him to profit from instruction in this college. An applicant must take the Test of English as a Foreign Language (TOEFL) either in his own country or at a testing center in the United States.

REQUIREMENTS FOR ADMISSION AS A GRADUATE STUDENT

All students desiring to do graduate work must file for admission at the Admissions Office. This applies not only to graduates of other colleges, but to students at the California State Polytechnic College. Graduates of this college must reapply for admission as graduate students.

For admission as a graduate student with Unclassified Graduate status, a student shall have completed a four-year course and hold an acceptable baccalaureate degree from an accredited institution; or shall have completed an equivalent academic preparation as determined by the College and must meet satisfactorily the professional, personal, scholastic, and other standards for graduate study, including qualifying examinations, as the appropriate College authorities may prescribe. Two copies of each transcript of all undergraduate and graduate studies undertaken must be submitted.

An Unclassified Graduate Student may, upon application, be admitted to an authorized master's degree curriculum of the College in Classified Graduate Status upon completion of the requirements as specified by the College for the particular master's degree program.

See the Graduate Study Bulletin for further details.

GRADUATE COURSES TAKEN BY UNDERGRADUATES

Undergraduates who are within 12 quarter units of graduation may petition to use up to 9 quarter units of work in 300, 400 or 500 series courses as graduate credit, when such courses are not required in order to receive the baccalaureate. Students should verify the applicability of such credit toward their graduate objective.

MATRICULATION

Matriculation refers to the complete process of being admitted to the college as a candidate for a certificate, degree, or credential and requires that the student who applies for admission as an undergraduate present a completed application for admission, college aptitude test results, statement of residence, and transcripts of his previous academic training including transcripts from high school and/or college. Applicants for admission as graduate students must present satisfactory evidence of their qualifications to enroll including two copies of transcript certifying graduation from an accredited college or university.

All students must complete the matriculation process.

REGISTRATION

All students must complete the required residence questionnaire in advance so that their residence status can be determined prior to registration.

All students are required to register as majors in a specific department of the College.

The schedule for registration and payment of fees is published in the "Class Schedule and Instructions for Registration" which is sold prior to the start of each quarter. Students should consult this booklet for detailed registration procedures.

Credit for course work completed is given only when the student is properly registered. A student is not properly registered unless his completed quarter registration forms, listing the program approved by his adviser, are on file in the Registrar's Office. Individuals are not admitted to courses unless they are registered as students at the College.



CHANGES IN CURRICULUM

Students who find that they are preparing for a profession which does not provide the type of education for which they have the greatest aptitude should contact their adviser and the college Counseling Center for advice and assistance in making curriculum changes. Students will be permitted to change their major curriculum after a minimum of one quarter in residence during which they follow the prescribed curriculum for their current major as far as possible. Admission to a new curriculum will depend on the availability of space within the limitations imposed by budget, faculty, and facilities.

Transfer from one curriculum to another does not in any way change a student's scholastic standing.

Transfer from a technical to a degree curriculum may be permitted subject to scholarship requirements and completion of the specified number of units in residence.

Upon transfer from a degree to a technical curriculum, at the College, a student's record is evaluated in terms of the technical curriculum. Courses completed prior to transfer which are applicable to the required courses in the technical curriculum will be transferred intact. The remaining courses completed prior to transfer must apply as electives up to, but not in excess of, the number of elective units specified in the technical curriculum. In the case of an excess of elective units, the student may choose which units shall apply. For purposes of computing the grade point average for graduation, only those courses transferred as outlined above and those taken subsequent to transfer will be used.

REVISION OF CURRICULAR REQUIREMENTS

A student remaining in continuous attendance in regular quarters and continuing on the same curriculum may, for purposes of meeting graduation requirements, elect to meet the graduation requirements in effect either at the time of his entering the curriculum or at the time of his graduation therefrom, except that substitutions for discontinued courses may be authorized or required by the dean of his school.

CURRICULUM DEVIATION

Although the College has specified a curriculum for each major, under certain conditions a student may be permitted some deviation from the established curriculum. Detailed instructions for applying for a curriculum deviation may be obtained from the Registrar's Office.

PROGRAM CHANGES

The student is held responsible for every course appearing on his official program card. Each change must be made on or before the applicable last date as published in the academic calendar and must be filed with the Registrar's Office on the proper form. During the first two weeks of each quarter students make program changes by presenting their Change of Program cards to instructors. Changes are not made on forms issued at the Registrar's Office during this period.

Changes which must be made on or before the last day to add courses include adding a class, increasing units in a course, changing from audit to credit. Changes which must be made on or before the last day for dropping classes without penalty include dropping a class (no penalty), reducing units in a course, changing a section of a course, changing from credit to audit. After the 7th calendar day, forms for the change of program may be obtained from the Registrar's Office.

The last day to drop classes without penalty during the regular quarters is the 14th calendar day following the day on which classes begin. After this day a student may withdraw from a course in which he is enrolled for credit only by accepting a grade based upon his standing in the course at the time of withdrawal. After the 14th calendar day, forms for withdrawing from class may be obtained from the Registrar's Office. The instructor will indicate on the form whether the student is to receive a grade of WF (withdrew failing) or W (withdrew) for the course. The grade of W indicates that the student is passing (Grade A to D) in the course at the time of withdrawal. Except for college-recognized emergencies, no withdrawals from a course will be permitted after the end of the seventh week of instruction.

A special provision, applicable only to students in their first quarter at the College, permits the substitution, without prejudice, of a prerequisite course in a sequence of courses for a later course in the sequence through the end of the fourth week. Only the substituted course appears on the transcript and the grade is based on performance after the change.

Students who withdraw from college prior to the end of the quarter will receive a W or a WF grade in each course depending upon whether passing or failing work has been accomplished up to the time of withdrawal.



DEGREES AND SCHOLASTIC REQUIREMENTS



Degrees

DEGREES OFFERED

<i>Schools and Departments</i>	<i>Curricula with Options/Concentrations</i>	<i>Degrees</i>
School of Agriculture and Natural Resources		
	Agriculture	M.S.
	General Agricultural Sciences	
	International Agriculture	
	Soil Conservation	
Agricultural Management Department	Agricultural Business Management	B.S.
	Farm Management	B.S.
Agricultural Education Department		
Agricultural Engineering Department	Agricultural Engineering	B.S.
	Power and Machinery	
	Soil and Water	
	Mechanized Agriculture	B.S.
	Management and Sales	
	Manufacturing	
	Service and Teaching	
Animal Science Department	Animal Science	B.S.
Crop Science Department	Crop Science	B.S.
	Agonomy	
	Plant Protection	
	Vegetable Crop	
	Fruit Science	B.S.
Dairy Science Department	Dairy Science	B.S.
	Husbandry, Manufacturing	
Food Industries Department	Food Industries	B.S.
	Management, Meats	
Natural Resources Management Department	Natural Resources Management	B.S.
Ornamental Horticulture Department	Ornamental Horticulture	B.S.
Poultry Industry Department	Poultry Industry	B.S.
Soil Science Department	Soil Science	B.S.
Veterinary Science Department		

School of Architecture and Environmental Design

<i>Schools and Departments</i>	<i>Curricula with Options/Concentrations</i>	<i>Degrees</i>
	Architecture	B.Arch.
	Architectural Engineering	B.S.
	City and Regional Planning	B.S.
	Construction Engineering	B.S.

School of Business and Social Sciences

Business Administration Department	Business Administration Accounting, Economics, Finance and Property Management, Industrial Relations, Management, Marketing	B.S., M.B.A.
Economics Department	Economics Economic Theory & Application, International Trade & Development, Industrial Economics	B.S.
Social Sciences Department	Social Sciences Government Service Social Sciences, Social Services Political Science Administration, International Affairs, Teaching	B.S. B.A.

School of Communicative Arts and Humanities

Art Department		
English Department	English	B.A., M.A.
Foreign Language and Linguistics Department		
Graphic Communications Department	Graphic Communications Graphic Design Printing Education Printing Management	B.S.
History Department	History	B.A.
Journalism Department	Journalism Agricultural, Broadcast Media, Business and Industrial, Community, Home Economics, Public Relations Advertising, Photojournalism	B.S.
Music Department		
Philosophy Department		
Speech Department	Speech	B.A.

Degrees

School of Engineering and Technology

<i>Schools and Departments</i>	<i>Curricula with Options/Concentrations</i>	<i>Degrees</i>
	Engineering	M.Engr.
Aeronautical Engineering Department	Aeronautical Engineering	B.S.
Electrical Engineering Department	Electrical Engineering	B.S.
Electronic Engineering Department	Electronic Engineering	B.S.
Engineering Technology Department	Engineering Technology Air Conditioning-Refrigeration, Electronic, Manufacturing Processes, Mechanical, Welding	B.S.
Environmental Engineering Department	Environmental Engineering Air Conditioning-Refrigeration Air Pollution Control	B.S.
Industrial Engineering Department	Industrial Engineering Production, Systems	B.S.
Industrial Technology Department	Industrial Arts Automotive Technology, Drafting, Electronics, Graphic Arts, Metals, Wood Plastics Technology Industrial Technology	B.A. B.S.
Mechanical Engineering Department	Mechanical Engineering General, Nuclear Engineering	B.S.
Welding and Metallurgical Engineering Department	Metallurgical Engineering	B.S.
Transportation Engineering Department	Transportation Engineering	B.S.

School of Human Development and Education

<i>Schools and Departments</i>	<i>Curricular with Options/Concentrations</i>	<i>Degrees</i>
Child Development Department	Child Development	B.S.
Education Department	Education Counseling and Guidance, Curriculum and Instruction Physical Sciences, School Supervision, Social Sciences	M.A.
Ethnic Studies Department		
Home Economics Department	Home Economics Food Administration—Dietetics, Home Economics Education	B.S., M.S.
Men's Physical Education Department	Physical Education	B.S., M.S.
Psychology Department		
Women's Physical Education Department	Physical Education	B.S., M.S.

School of Sciences and Mathematics

Biological Sciences Department	Biological Sciences Biology, Botany, Field Biology, Marine Biology, Medical Laboratory Technology, Microbiology, Plant Pathology/Entomology, Zoology	B.S., M.S.
Chemistry Department	Biochemistry Chemistry	B.S. B.S.
Computer Science and Statistics Department	Computer Science	B.S.
Mathematics Department	Mathematics Applied Mathematics, Computer Sciences, Mathematics Teaching, Statistics	B.S., M.S., M.A.
Military Science Department		
Physics Department	Physics	B.S.

DEGREE REQUIREMENTS

Curricula leading to graduation with the degree of bachelor of science are offered in agriculture, engineering, applied arts, applied sciences and architecture. Occupational majors in these fields are described under the corresponding sections of this catalog. In addition, the College offers the following degrees: master of science, master of arts, bachelor of architecture, bachelor of arts, bachelor of vocational education. It also offers the two-year technical certificate in agriculture. Programs leading to teaching credentials authorizing service in the public schools are described under the heading "Teacher Preparation Programs".

APPLICATION FOR GRADUATION

Students shall file application for graduation in the Registrar's Office prior to the last date for filing such applications, as shown in the college calendar. Application forms and evaluations for graduation are available in the Evaluations Office. The effective date of graduation will be the date when all requirements have been met.

DOUBLE MAJORS

The student will normally meet graduation requirements for a degree in one of the major curricula.

It is permissible for a student to be granted a bachelor's degree with two majors if the complete requirements of both major curricula have been met at the time he files his application for graduation.

A student who desires to submit only one senior project covering two graduation majors must file a petition for special consideration prior to the date of commencing the senior project.

SECOND BACHELOR'S DEGREE

A qualified student who holds a bachelor's degree from this College or from another accredited institution may be awarded a second bachelor's degree in a different major when all requirements have been met and providing a minimum of 36 units of course work have been completed in residence after the requirements for the first degree have been fulfilled.

BACHELOR'S DEGREES

GENERAL REQUIREMENTS FOR GRADUATION

All candidates for the bachelor of science degree, the bachelor of arts degree, or the bachelor of architecture degree shall have completed the requirements in one of the listed curricula with a minimum "C" grade average for all units in the major, and shall have earned a total number of grade points at least equal to twice the number of units attempted. Transfer students, in their work taken at this college, must earn a number of grade points at least equal to twice the number of units attempted at this college. All candidates for these degrees shall have earned not less than 50 quarter units in residence, and shall have earned at least 30 of these units among the last 40 units counted toward the degree. (Extension credit or credit by examination may not be used to fulfill the residence requirement.)

Candidates for the bachelor of science degree from the School of Engineering and Technology must present a minimum of 192 to 204 quarter units of credit for graduation depending on the major. Candidates for the bachelor of science degree from the School of Agriculture and Natural Resources (except agricultural engineering which requires 204 quarter units) must present a minimum of 198 units of credit for graduation.

Candidates from the School of Architecture and Environmental Design must present a minimum of 255 units for the bachelor of architecture degree, 210 units for the bachelor of science degrees in Architectural Engineering and Construction

Engineering, and 198 units for the bachelor of science in City and Regional Planning.

Candidates from other schools must present a minimum of 198 quarter units of credit for the bachelor of science degree and 186 quarter units for the bachelor of arts degree. A minor may be required for the bachelor of arts degree. Available fields include those designed for teaching credential purposes.

GENERAL EDUCATION BREADTH REQUIREMENT

All candidates for the bachelor's degree must complete a minimum of 65 quarter units of general education as specified below. The curriculum for each major published in this catalog is designed to satisfy the general education breadth requirement. The requirement is met in different ways depending on the particular major. The student planning to transfer from another college should therefore consult the published curriculum for his major and plan his course work accordingly.

No course shall be used for this purpose if it has a prerequisite unless such prerequisite is also counted as general education. Only degree credit courses in the 100, 200, and 300 series may be counted as general education. No more than six units in the major academic discipline of the student may be counted as fulfilling the general education requirement.

Natural Sciences

At least 15 units chosen from courses in the natural sciences with no more than three courses having the same prefix and with at least one course in life science (Bact, Bio, Bot, Cons, Ent, Zoo) and at least one course in physical science (Astr, Chem, Geol, PSc, Phys). Maximum 24 units.

Social Sciences

At least 15 units chosen from courses in Ant, Ec, Geog, Hist, Pol Sc, Psy, Soc Sc, Soc. All students must take Hist 204, Hist 205 and Pol Sc 201.¹ No more than two courses having the same prefix may be counted in this category. Maximum 21 units.

Humanities

At least 9 units chosen from Art, Dr, Literature (Eng), Mu, and Phil, including at least two courses in literature and philosophy, but no more than 3 units each in Art, Drama and Mu. Maximum 18 units.

Basic Subjects

Mathematical sciences (CSc, Math, Stat) (at least a 3-unit course), written communication (Eng) (one course), oral (Sp) or written communication (at least one course). Minimum 12 units, maximum 16 units.

Other Subjects

Physical education (5 units, including at least 2 units of health education and 3 units of physical education activity).²

Any course outside the student's major with not more than 3 units in one department. Minimum 5 units, maximum 11 units.

¹ These courses are required to satisfy Section 40404 of the Administrative Code, but the units may also be counted as general education (Section 40405). Transfer students, certified as having completed the general education requirement, will have to complete this requirement separately if they have not already done so. (Social sciences and history majors will take an equivalent sequence.)

² The President may designate another course as a substitute for health education upon receipt of a statement of contrary religious belief. The President may exempt a student from physical education activity upon receipt of medical authority and may exempt persons over 25 years of age. Any student may claim military service as a substitution for the physical education activity requirement.

MASTER'S DEGREES

The College offers graduate programs leading to the master's degree in several areas. Curricula for the master's degrees are briefly outlined in the appropriate departmental sections of this catalog. For complete requirements for graduate study and for the master's degrees consult the *Graduate Study Bulletin*.

TEACHER PREPARATION PROGRAMS

California State Polytechnic College is accredited by the State Board of Education to recommend for the following teaching credentials:

- Standard Teaching Credential with Specialization in Elementary Teaching
- Standard Teaching Credential with Specialization in Secondary Teaching

Recommended majors are:

Agricultural Sciences, Biological Sciences, Chemistry, English, History, Home Economics, Industrial Arts, Journalism, Mathematics, Physical Education (for men and women), Physics, Social Sciences, and Speech

Recommended minors are:

Art, Biological Sciences, Chemistry, English, History, Home Economics, Industrial Arts, Journalism, Mathematics, Music, Physical Education, Physical Sciences, Physics, Political Science, Speech, and (for the secondary credential only) Agricultural Science and Social Sciences.

In addition the College is accredited to recommend for the Standard Designated Services Credential, Specialization in Counseling, and the Standard Supervision Credential (Supervision and Principalship).

For teaching credential requirements and procedures for entering the teacher education program consult the Education Department. A bulletin, Standard Teaching Credential Requirements, is available upon request.

ADMISSION TO CANDIDACY FOR TEACHING CREDENTIAL

The selection of candidates to prepare for teaching is accomplished through a three-step process, involving teacher education committees. These committees determine policies for the teacher education program, review the qualifications of all candidates, and hear appeals where rejection of candidates has occurred. The three steps leading to the final completion of the credential are:

- Step 1. Approval to enter the teacher education program
- Step 2. Approval to participate in student teaching
- Step 3. Final approval for a teaching credential

A student who enters the college with the intention of earning a teaching credential must be approved as a candidate for the particular credential which he is seeking.

Admission to the college is not equivalent to being accepted for the teacher education program.

Requirements and procedures for qualifying for acceptance of candidacy may be secured in the Education Department Office. Prompt attention to the college's procedures is necessary since approval for candidacy is prerequisite to certain professional courses and student teaching.

Evaluation of the student's qualification is based on the following factors:

1. *Academic Aptitude.* The candidate shall demonstrate academic aptitude by showing a satisfactory score on a college aptitude test or by demonstrating compensating strength in other qualities.
2. *Scholarship.* Satisfactory scholarship on all work accepted by the College must be in evidence before approval of candidacy for the teaching credential.
 - Elementary credential—grade point average of 2.25
 - Secondary credential—grade point average of 2.50
3. *Professional Aptitude.* The candidate must demonstrate suitable aptitude and fitness for teaching and for adjusting to public school conditions. These qualities are evaluated by committees and are based on evidence provided through tests, interviews, and personal contacts.

4. *Physical Fitness.* Evidence of good physical health must be shown before the time of student teaching.
5. *Fundamental Skills.* The candidate must demonstrate proficiency in the fundamental skills, as determined by observation, written tests, and individual examinations. Fundamental skills may include oral and written language and mathematics.
6. *Personality and Character.* The candidate is expected to possess personality and character traits in keeping with the standards of the teaching profession. Qualifications are evaluated by committees and are based on tests, observations, and interviews.
7. *Many-sided Interests.* The candidate must demonstrate diverse and well-balanced interests. He must be able to understand and interpret his major interest and field of study in suitable relationship to all others.

TWO-YEAR TECHNICAL CURRICULA

All candidates for a technical certificate shall have completed 98 quarter units of courses approved by the department granting the certificate, shall have been in residence at least two quarters immediately preceding graduation, shall have earned not less than 32 quarter units in residence, and shall have earned a total number of grade points at least equal to twice the number of units attempted.

ACADEMIC POLICIES

Academic Obligations

Each student is expected to be diligent in the pursuit of his course of study in order that both he and the State will receive maximum benefit from the educational opportunities provided.

Students are expected to satisfy the academic demands required by their instructors in such ways as they may set forth, in order to satisfy the instructor that they are performing their assignments in a proper manner.

An instructor, with the President's approval, may at any time exclude from his course any student guilty of unbecoming or disorderly conduct toward the instructor or the class. The instructor may refer the case of misconduct to the Dean of Students for disciplinary action.

Class Attendance

Students are expected to be regular in attendance to keep the quality and quantity of work high. Absence from classes is regarded as serious, and no excuses for work missed are provided.

An excused absence can be allowed only by the instructor in charge of the class upon consideration of the evidence justifying the absence presented by the student. An excused absence merely gives the individual who missed the class an opportunity to make up the work and in no way excuses him from the work required.

Minimum Scholarship Requirements

Uniform minimum standards for academic probation or disqualification are in effect at all California State Colleges. Students at California State Polytechnic College will be placed on academic probation or will be disqualified under the following conditions:

1. A student will be placed on academic probation if his cumulative grade point average falls below 2.0 (C) either for all academic work attempted or for all such work attempted at this college. The student will be advised of probation status as promptly as possible.

2. A student will be removed from probation and restored to good standing when he earns a cumulative grade point average of 2.0 (C) for all academic work attempted and for all such work attempted at this college.

3. A student on probation *may* be disqualified when his cumulative grade point average for all academic work attempted or for all such work attempted at this

Academic Policies

college is 7 or more grade points below 2.0 (C average). Such a student *will* be disqualified when his academic record, as indicated in the sentence above, falls below the following standards:

- a. If a freshman or sophomore student (less than 90 quarter units of college work completed) is $22\frac{1}{2}$ or more grade points below a 2.0 (C average).
- b. If a junior student (90 to 134 quarter units of college work completed) is $13\frac{1}{2}$ or more grade points below a 2.0 (C average).
- c. If a senior student (135 or more quarter units of college work completed) is 9 or more grade points below a 2.0 (C average).
4. A student to be disqualified will be so notified as soon as possible following the end of the quarter in which his achievement fails to meet conditions prescribed in No. 3, above. In any case, disqualification is to be effected by the close of the next quarter.
5. The dean of the school in which the student is enrolled as a major may make exceptions to these conditions when such action seems justified in individual cases.
6. A student who is disqualified for failure to maintain satisfactory academic progress will not be readmitted until at least one regular quarter has elapsed and then only after presentation to the college of satisfactory evidence that he has improved his chances of scholastic success. The request for readmission will be referred to the dean of the school in which the student wishes to enroll.

ACADEMIC PROBATION

Students with a cumulative grade point average of less than 2.0 may not participate on intercollegiate teams nor may they hold positions of leadership in student organizations or student government groups. This includes, but is not limited to, such groups as: athletic teams, debate teams, drama casts, judging teams, drill teams, Model U.N. delegation, rifle team, ASI councils, boards and committees. Such students may not hold an office in a student organization, nor may they be editors, managers, or hold similar positions on student publications. Students on academic probation may participate in such activities as club membership, intramurals, and music, that do not include travel and the official representation of the College.

The 2.0 cumulative grade point average is meant to be a minimum standard and certain groups may have set higher standards for specific positions or areas of responsibility that require considerable commitments of time and energy.

ELIGIBILITY FOR INTERCOLLEGIATE ATHLETICS

Eligibility for competition in intercollegiate athletics is regulated in general by the rules of the National Collegiate Athletic Association and specifically by current conference and college regulations.

1. Competition on a varsity team is open to a student in regular standing in a degree curriculum who, during the season of competition, is carrying at least 12 quarter units selected to provide substantial progress toward his educational objective.
2. The student must have at the beginning of his competition in any sport at least a C (2.0) cumulative grade point average in all college work attempted.
3. The student must have passed a minimum of 36 quarter units between seasons of competition.
4. Freshmen are not eligible for varsity competition in football or basketball.
5. A transfer student from a four-year college must after transfer spend at least one calendar year and pass 36 quarter units in at least two regular semesters or three regular quarters at this institution or a junior college, or combination of both, before being eligible for varsity competition.
6. A junior college transfer is eligible for varsity competition under any one of the following conditions:
 - a. He is a graduate of a junior college.
 - b. He has accumulated a minimum of 72 quarter units of transferable degree credit with a C (2.0) average at a junior college.
 - c. He presents a minimum of 36 quarter units of transferable degree credit with a B (3.0) average from a junior college.

- d. He presents a minimum of 36 quarter units of transferable degree credit from a junior college with a cumulative grade point average of 2.5, provided a minimum grade point average of 1.6 or better on the NCAA National Experience Table was predicted at the time of his graduation from high school.

A transfer with one year of junior college competition in a sport is permitted three years of varsity competition in that sport. A transfer with two years of junior college competition is permitted two years of varsity competition.

Grading System

The following grading system is in effect:

A—Superior	E—Incomplete
B—Better than average	F—Failure
C—Average	P—Passing (workshops only)
D—Barely passing	W—Withdrew from course without failure
WF—Withdrew from course failing	

Grade points are assigned to the various grades (except grades P and E) as follows:

- For each unit of Grade A—4 points
- For each unit of Grade B—3 points
- For each unit of Grade C—2 points
- For each unit of Grade D—1 point
- For each unit of Grade F or WF—0 point

Passing grades are marked A, B, C, D. Grade E indicates incomplete work. Grade E may be given to a student for either of the following reasons:

1. Passing in classwork, but unable to take final examination.
2. Passing in classwork completed and in final examination, but some assigned work not completed.

Grade E may be removed within one year from the time it is recorded by completing all unfinished work as the instructor may determine. The removal of grade E entitles the student to the number of units and grade points assigned to his completed grade. The effective date of the completed grade is the end of the quarter in which the grade change is received. If not removed within the one-year period, the grade E remains on the student's permanent record and credit for the course may be obtained only by repeating it.

No units or grade points will be assigned for the course in which grade E is assigned unless and until the grade is changed.

A student may repeat a course in which he has received a grade lower than C under the following condition: Each time the course is taken the student will be charged with units attempted and will receive the grade points earned. Unit credit is given only once for a repeated course and is recorded the first time the course is passed.

Except where noted in the specific course description, a student may not enroll in (except as an auditor) or receive credit by examination for any course in which he has received a grade of C or higher.

Course Numbering System

The numbering system used is a three-digit system. Courses are generally numbered according to the plan shown below.

The first digit indicates the level or year in which the courses are normally taught.

10- 99—Special program courses	400-499—Senior courses
100-199—Freshman courses	500-599—Graduate courses
200-299—Sophomore courses	600-699—Professional courses
300-399—Junior courses	

The second digit indicates the type of course with numbers assigned as follows:

- 0 or 1—Lecture courses
- 2 or 3—Courses involving both lecture and laboratory
- 4 or 5—Courses composed entirely of laboratory work
- 6 or 7—Senior project or seminar
- 8 or 9—Graduate thesis or seminar

Academic Policies

The third digit indicates the quarter in which the course is normally taught.

1, 4 or 7—Fall quarter course

2, 5 or 8—Winter quarter course

3, 6 or 9—Spring quarter course

NOTE: Courses numbered 10-99 are either non-degree credit short-courses or courses offered for foreign students under contract with the U.S. Agency for International Development. Courses numbered 600-699 are for professional advancement within a special field and do not carry credit for degree requirements in any of the curricula.

Maximum and Minimum Loads

The maximum load for regular students is 20 quarter units of work including audited courses and concurrent work at other colleges; the only exceptions are made with the advance approval of the student's major department head and completion of a petition to carry excess load which is available at the Registrar's Office. Regular credit will not be given for a course completed in any quarter unless the course appears on the student's approved program card for that quarter. Maximum load requirements may be waived only on presentation of evidence of ability to carry successfully such a group of courses. Maximum load for graduate students is 16 units per quarter.

RECORDS PROCEDURES

Holding of Records

Student records may be placed in a "Hold" status because of financial or other obligations to the college. While the student's records are so held, he will not be issued a "permit to register" nor will transcripts of his credits be released to anyone. The student's records will be held until the obligation is cleared to the satisfaction of the office or department placing the "Hold."

Transfer to Other Colleges

Students who plan to transfer from the California State Polytechnic College to another college or university should, at the earliest possible date, request that their transcript of record be forwarded by the Registrar's Office. Any evaluation of transcripts presented to another college or university will be made by the new institution in terms of its established policies.

Honorable Dismissal

Honorable dismissal is noted on the transcript of each student who graduates or withdraws from the college, unless he has been disqualified because of misconduct.

CREDIT POLICY

Credit by Examination

A student enrolled either as a regular or limited student may be permitted, at the discretion of his school dean, to obtain credit by examination for courses in subject matter fields in which he is especially qualified through previous education or experience and for which credit has not otherwise been given. A fee of \$1 per unit is charged for such an examination. It may include written, oral, or skills tests, or a combination of all three types, and will be sufficiently comprehensive to determine that the student has essentially the same knowledge and skills as those students who successfully complete the course. A student is not permitted to obtain credit by examination in a course unless all prerequisites for the course as specified in this catalog have been satisfied. The grade received is entered on the student's permanent record. The length of the examination will be consistent with the unit value of the course.

A credit by examination request will not be considered for a course for which a student has received a failing grade at Cal Poly or for which a student has previously unsuccessfully attempted credit by examination.

Units of credit received through this procedure may not apply toward the residence requirements for any of the degrees or credentials offered by the college.

Detailed instructions for applying for credit by examination may be obtained from the Registrar's Office.

Advanced Placement

The College offers credit and advanced placement for those students who achieve scores of 3, 4, or 5, on the College Entrance Board advanced placement examinations. A maximum of nine quarter units of lower division credit will be granted for such achievement upon request and submission of the examination results to the Director, Admissions, Records and Evaluations.

Students who wish advanced placement credit on the basis of such examination results may petition for such credit either as elective credit or as credit for a particular subject on a form provided by the Registrar's Office. Granting of advanced placement is at the discretion of the dean of the school and department head involved.

Auditing of Courses

An auditor is a student who is attending courses for no credit. He must be registered with fees paid for the quarter in which the course he desires to audit is offered. Audited courses must be included on the student's study list with the designation "AUD" in the "units" column along with the number of units. A student may enroll to audit a course during the first week of instruction and no later than the last day to add a course. The deadline to change from audit to credit is the same as the last day to add a course. A student may change from credit to audit no later than the last day to drop a course without penalty.

In cases where class sections must be limited in enrollment, preference will be given to students enrolling for credit.

The materials and service fee and non-resident tuition fee are determined on the basis of the total units for which the student is enrolled including courses audited.

Credit for Military Service

Nine quarter units of elective credit will be allowed toward graduation to any student with honorable discharge submitting evidence of satisfactory completion of one year of training in the military service of the United States.

In addition to the nine quarter units, 13½ quarter units of elective credit will be allowed toward graduation to any student submitting evidence that he has received a commission in the Army, Navy, Air Force, Coast Guard, or Marine Corps. Maximum total credit possible toward graduation for military service is 22½ quarter units. Credit is not given for completion of the six-month Reserve Training Programs or for college level General Educational Development Tests.

No grade points are assigned in connection with units of credit allowed for military service. The units allowed are not included in scholarship computations. In allowing for credit for inservice training, California State Polytechnic College follows the recommendations of the American Council on Education in terms of units allowed and subject matter covered.

HONORS

Candidates for bachelor's degrees are eligible for "Graduation with Honors" if at the end of winter quarter preceding commencement they have earned a 3.1 or better cumulative grade point average, including all college level work attempted at Cal Poly and all college level work accepted from other institutions.

The "President's Honors List" is compiled at the end of each college year to honor those undergraduate students who have demonstrated consistent achievement, as represented by being named to the "Dean's Honors List" for any three of the four quarters of the college year.

The "Dean's Honors List" is compiled at the end of each quarter to honor undergraduate students who have completed 12 or more units during the quarter with a grade point average which places them in the top 15 percent of the students in their school.

Entering freshmen who rank in the top five percent of high school graduates are granted "Honors at Entrance."



STUDENT ACTIVITIES AND SERVICES



Student Activities

STUDENT ACTIVITIES

The College provides an integrated program of classroom and laboratory instruction, gainful employment, and co-curricular activities. The latter are under the direction of the Associate Dean, Activities, who is responsible for initiating and coordinating a well-rounded program of activities designed to develop leadership qualities in all students.

STUDENT GOVERNMENT

All students are members of the student association known as the Associated Students of California State Polytechnic College at San Luis Obispo, Inc. The government of student affairs and the control of property are vested in the Student Affairs Council, the members of which are selected according to regulations established in the student body bylaws. In addition, there are boards established to oversee publications, athletics, music, College Union program, and Poly Royal. All interested students have an opportunity to participate in student government.

ATHLETICS

Intercollegiate competition is held under the rules and auspices of the National Collegiate Athletic Association. Conference competition is maintained in most sports as a member of the California Collegiate Athletic Association. A full program of intercollegiate competition is offered in football, basketball, baseball, track, wrestling, gymnastics, swimming, water polo, golf, and cross country, all of which are major sports. Awards are given to letter winners. Freshman competition is offered in sports where competition is available and sufficient interest warrants it.

The Physical Education Department offers physical activities designed to provide a sound program of recreation, education in physical skills, and the give-and-take of games. Varsity teams in the intercollegiate sports offer opportunity for the more skilled. Intramural teams provide year-round competition in a dozen sports at an easier level of play to all who wish to enter. Trophies are awarded winners in touch football, track, horseshoes, basketball, volleyball, swimming, wrestling, badminton, softball, tennis and golf. For eligibility rules see ELIGIBILITY FOR INTERCOLLEGIATE ATHLETICS.

COLLEGE UNION PROGRAM

Most of the social programming on the campus is done by the College Union Program Board and its 11 committees. The board is affiliated with the Association of College Unions and it functions within policies and budgets of the Student Affairs Council. Committee membership is open to all interested students. The committees cover assemblies, dance, drama, films, fine arts, games and hobbies, outings, personnel, public relations, social, and special events.

PUBLICATIONS

Publications of the student body at the California State Polytechnic College, San Luis Obispo, are not only written and edited by students, but are also printed in the college's printing department as laboratory work for students majoring in printing. Editorial and photographic work for publications is handled primarily by students of the journalism classes. *Mustang Daily* is the official newspaper of the associated students. *El Rodeo* is the College yearbook. *Alternative* is the College literary magazine. Miscellaneous publications include the *California Future Farmer* magazine, a monthly magazine supported by and mailed to 19,000 Future Farmers of America members in nearly 200 California high schools; and the *Mustang Handbook*.

POLY ROYAL

Each year during the spring the College has an open house exhibition and show conducted primarily by the Associated Students. This event is known as Poly Royal, "A Country Fair on a College Campus." Its purpose is to display work accomplished during the year by students. Each department of the college prepares displays that reflect the curriculum within that department and its relation to employment, as well as the activities and success of the graduates. Besides the shows and exhibits there are many entertainment features such as intercollegiate baseball, swimming, and rodeo. Other special events include dramatic presentations, aquacade, carnival, various judging contests that involve adult visitors, and a mathematics contest featuring students from high schools throughout the State.

CAMPUS ORGANIZATIONS

Clubs and organizations cover all departments and activities, and the opportunity exists for every student to take an active part in club life. There are departmental and professional organizations, hobby-interest clubs and many others serving the areas of honor societies, service clubs, residence groups, ethnic groups, and religious faith groups.

STUDENT SERVICES

The College provides a number of services designed to help the student in his college work. Some of the services are directed toward group activities and experiences, others toward helping students overcome individual problems.

Counseling and Testing

The Counseling Center, under the direction of the Associate Dean, Counseling and Testing offers service in vocational, educational, and personal counseling in accordance with the needs of the student. A well-equipped test center, under the direction of the Test Officer, is available to assist the students and counselors.

Advising

Each new student is assigned an adviser in his major department when he enrolls at college. This adviser helps the new student solve problems involved in becoming oriented to college life and helps to arrange a sound course of study for him. Returning students and college transfers are also assigned an adviser who helps the student arrange his instructional program.

Health Services

The staff and facilities of the Student Health Center are dedicated to the ideals of preventive, diagnostic and therapeutic medicine. These services are offered with an emphasis on health education. In general, the same approach as that of the student's own family physician is provided. The Health Center staff has several full-time physicians, registered nurses, and medical technologists. The Health Center is comprised of two units: a thirty-bed, fully-accredited hospital and an outpatient department. It provides a well-equipped clinic and hospital with facilities for minor surgery, pharmacy, laboratory, physical therapy, medical records, and diagnostic X-ray facilities.

The health program is financed by the student in three steps. For complete medical coverage, each regular student should participate in all three:

- 1) The materials and service fee allows limited outpatient care from 8 a.m. to 5 p.m., Monday through Friday.
- 2) An optional local health fee of \$24 per academic year or \$9 per individual quarter entitles the student to campus hospitalization and 24-hour emergency care by a college physician. Additional services under this program are physical therapy and prescription service in the campus pharmacy. Any full-time student, even without this prepaid campus health plan, may still avail himself of these benefits by paying a fee for service.

Student Housing

- 3) Supplementary major medical and hospital insurance is offered through the A.S.I. to cover major surgery and emergency expenses incurred away from campus.

A health statement on a form provided by the College is required of each student; the physical examination is optional. Chest X-rays and tetanus immunizations recommended for each new student are provided by the Health Center.

Student Housing and Dining Services

ON-CAMPUS HOUSING

On-campus residence hall facilities are available for both men and women students.

The College believes a stimulating intellectual and social environment in housing units is an important part of the student's education. Study is encouraged through the observance of regular quiet hours. Residents also have ample opportunity to participate in intramural activities, discussion groups, and social events with other halls. This environment also is recommended for foreign students to facilitate social, educational, and cultural adjustments. Each hall is staffed with professional personnel.

New students who wish to live in the residence halls should request on-campus housing when they apply to the College for admission. Assignment to available on-campus housing is made according to the date of acceptance for admission to the College.

Notification of the availability, or the unavailability, of on-campus housing after acceptance for admission to the College is normally made shortly after June 1 for the Fall Quarter.

Housing licenses are mailed to students accepted for on-campus housing. Signed licenses, accompanied by the required payment, must be returned by the deadline stated in the license. Failure to comply with the license stipulations automatically results in loss of housing assignment.

OFF-CAMPUS HOUSING

Privately owned and operated off-campus housing is available for both men and women students. The College does not inspect or supervise these facilities. Parents are responsible for the living arrangements of their sons and daughters.

Inquiries about off-campus housing should be made in person at the Housing Office.

FAMILY HOUSING

The Housing Office maintains a card file of apartments and rooms available to married students. It does not inspect or approve the facilities listed. Inquiries about the file should be made in person at the Housing Office.

DINING HALL

The Dining Hall provides a variety of food services designed to satisfy the varied desires of the student. The primary food service is a full-meal program for those students holding meal tickets. Two optional meal ticket plans are available. Plan 1 is a meal ticket providing 19 meals per week. Plan 2 is a meal ticket entitling the owner to his choice of any 12 meals each week.

In addition to the meal ticket program, a snack bar is available which offers a wide range of sandwiches, snacks, salads, desserts, and fountain items.

A vending area adjacent to the dining room and the new College Union provides for hot and cold sandwiches, beverages, and miscellaneous snacks.

FINANCIAL AID AND PLACEMENT

Placement

A centralized placement service is available to all students and alumni of the college. The Placement Office and instructional departments work together in assisting students to obtain the most suitable employment consistent with their preparation and experience.

A followup program conducted by the Placement Office includes contacting both the graduate and employer to appraise the effectiveness of the instructional programs in light of employer needs, and the satisfaction of employer and employee.

Teacher Placement

Every candidate for a credential should register with the Placement Office before or during the last quarter prior to completion of the credential requirements. Registration includes the preparation of personal data, and the listing of references for the confidential teacher placement folder which is sent by the Placement Office to school administrators who are considering the candidate for a teaching position. This folder is maintained permanently by the Placement Office for use whenever the teacher wishes to seek a new position. Cooperation of the candidate in keeping information in the folder up to date is necessary for most effective service.

Summer Employment

Students are encouraged to take summer employment in fields related to their major.

The Placement Office receives many summer job listings. Ranchers and businessmen visit the campus in person and large business concerns send recruiters to interview undergraduates for summer employment.

Part-time Employment

In addition to off-campus employment and opportunities for students to earn money through project activities, the College has established a policy of giving a maximum number of students experience by employing them to assist in the operations of the entire campus and farm. The number of campus jobs is greater than in the typical college where regular full-time employees do much more of the work.

Work Study Program

The College is participating in the Work Study Program which provides students who are eligible the opportunity of employment as set forth under the Economic Opportunity Act. Employment provisions under this program are parallel to those of other student employment on campus. Rates of pay vary depending on the job requirements and the skills of the worker. Information and applications may be obtained from the Financial Aid Counselor, Administration 213.

Financial Aid

The College has a variety of loan funds, scholarships, awards, and part-time employment opportunities designed to assist students financially. Students who must have assistance in order to complete their college work should read this section carefully. Additional information and applications may be obtained by writing to the Financial Aid Counselor.

SCHOLARSHIPS AND AWARDS

General Information

Scholarships awarded by the College are available to both entering and enrolled students who meet the scholastic and financial need requirements of the College scholarship funds. These scholarships are made available from various sources, usually corporations, individuals, or interested groups outside the campus. Approximately 225 scholarships are awarded yearly.

Financial Aid

How to Apply

To be considered for a scholarship, a student or prospective student must complete a scholarship application blank. Scholarship application blanks are available December 1st of each year and must be completed and returned before April 1st. Applications may be obtained by writing to the Financial Aid Counselor.

Selection Criteria

Applicants are judged upon their need, scholastic ability, character and participation in school and community affairs. In addition, certain scholarships require special conditions concerning field of study, residence, and other similar factors.

Generally, students must have at least a "B" average to place high enough in the scholarship ratings to be granted an award. However, there are scholarships which are granted to students with a lesser grade average. In some cases need, special qualifications, or a specific field of study will compensate for a lower grade average. It is recommended that a student apply if in doubt.

Additional Information

More information on scholarships available is included in the booklet "Financial Aid for Students" published by the College which may be obtained on request from the Financial Aid Counselor.

AGRICULTURE AND NATURAL RESOURCES

Entering Freshman or Advanced Student Scholarships

AGNESE DAVEY SCHOLARSHIP, (\$300), female student in Ornamental Horticulture.

TH. R. AND VALLEY M. KNUDSEN FOUNDATION SCHOLARSHIP, (\$600), Dairy Science.

LEOPOLD EDWARD WRASSE SCHOLARSHIPS, (\$500), awards to students in Agriculture with the following qualifications:

(1) of good character, industrious, and in need of assistance; (2) interested in a major agricultural field of study offered by the California State Polytechnic College with sufficient academic preparation and other background to show promise of success; except that Caruthers Union High School students may enroll in any of the schools at the College; (3) active in community or school affairs; (4) having earned a sum equal to one-half of the amount of the award within the 12-month period prior to receiving an award; (5) selected in the following priority: from (a) Caruthers Union High School; (b) high school in Fresno County; (c) other California secondary schools or California State Polytechnic College. Some 90 such scholarships are awarded annually.

Entering Freshman Scholarships

CALIFORNIA STATE GRANGE SCHOLARSHIPS, (\$250), to students in Animal Science, Dairy Science, or Crops Science (2).

CHALLENGE CREAMERY SCHOLARSHIP, (\$200), to a Future Farmer student in Dairy Science.

GENERAL FOODS FUND SCHOLARSHIPS, (\$400), to students in Food Industries or Agricultural Engineering (5).

E. C. LOOMIS AND SONS SCHOLARSHIP, (\$100), to the outstanding graduate in the vocational agriculture department of a San Luis Obispo County or Santa Maria District high school.

Advanced Student Scholarships

LLOYD ACKERMAN MEMORIAL SCHOLARSHIP, (\$500), to a senior in Food Industries, Crops Science, or Agricultural Management.

L. L. BENNION SCHOLARSHIP, (\$250), to a junior in Animal Science.

CALIFORNIA ASSOCIATION OF NURSERYMEN SCHOLARSHIP, (\$150), to a sophomore in Ornamental Horticulture.

CALIFORNIA ASSOCIATION OF NURSERYMEN, CENTRAL CHAPTER, SCHOLARSHIP, (\$100), to a student in Ornamental Horticulture.

Financial Aid

- CALIFORNIA ASSOCIATION OF NURSERYMEN, PENINSULA CHAPTER, SCHOLARSHIP, (\$150), to a student in Ornamental Horticulture.
- CALIFORNIA DAIRY INDUSTRIES ASSOCIATION SCHOLARSHIP, (\$600), to a student in Dairy Science.
- CALIFORNIA FERTILIZER ASSOCIATION SOIL IMPROVEMENT COMMITTEE SCHOLARSHIP, (\$200), to a sophomore or junior in Soil Science or Crops Science.
- WELLINGTON DAVEY SCHOLARSHIP, (\$300), to a student in Ornamental Horticulture.
- PAUL ECKE RANCH SCHOLARSHIP, (\$100), to a student in Ornamental Horticulture.
- GROUP SEVEN CALIFORNIA BANKERS ASSOCIATION SCHOLARSHIP, (\$500), to a student in Agriculture from San Luis Obispo, Santa Barbara, or Ventura County.
- HEARST FOUNDATION SCHOLARSHIPS, (\$500), to students in Agriculture.
- WILLIAM (BEN) AND HELEN HOLMAN ALUMNI AGRICULTURE SCHOLARSHIP, interest from a grant awarded yearly to an upper division Agriculture student in financial need and maintaining at least a 2.65 grade point average. To be selected by the Dean of the School of Agriculture and Natural Resources and the President of the Alumni Association in cooperation with the College Scholarship Committee.
- KINGS RIVER PRUNE AND APRICOT SCHOLARSHIP, (\$200), to a junior in Agriculture from Kings County.
- GEORGE LIEVRE MEMORIAL SCHOLARSHIP, (\$500), to a junior in Food Industries, Crops Science, or Agricultural Management.
- MENLO PARK KIWANIS CLUB SCHOLARSHIP, (\$150), to a student in Ornamental Horticulture or other Agriculture major from San Mateo or Santa Clara County.
- JAMES F. MERSON MEMORIAL SCHOLARSHIP, annual award to a junior in Agricultural Engineering.
- OLSON BROTHERS POULTRY SCHOLARSHIP, (\$500), to a student who has completed at least three quarters in Poultry Industry.
- HARRY PARKER MEMORIAL SCHOLARSHIP, award to a junior, senior, or fifth year student in Animal Science with an interest in beef cattle, who has attended California State Polytechnic College at least six quarters as a full-time student.
- POULTRYMEN'S COOPERATIVE ASSOCIATION OF SOUTHERN CALIFORNIA SCHOLARSHIP, (\$300), to a student who has completed at least three quarters in Poultry Industry from Fresno, Kings, Los Angeles, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, or Ventura County.
- HARRY ROSEDALE MEMORIAL SCHOLARSHIP, (\$100), to a student in Ornamental Horticulture.
- SANTA BARBARA COUNTY HORTICULTURE SOCIETY SCHOLARSHIP, (\$100), to a student in Ornamental Horticulture.
- GEORGE A. SMITH, JR. SCHOLARSHIP, (\$200), to a student in Animal Science specializing in beef or horses.
- TRACTOR AND IMPLEMENT CLUB OF CALIFORNIA SCHOLARSHIP, (\$500), to a student in Agricultural Engineering or Mechanized Agriculture.
- WESTERN AGRICULTURAL CHEMICALS ASSOCIATION SCHOLARSHIP, (\$500), to a student in Crops Science.
- WESTERN FAIRS ASSOCIATION SCHOLARSHIPS, (\$500), to students in Agricultural Management displaying interest in Fair Management.

Financial Aid

ARCHITECTURE AND ENVIRONMENTAL DESIGN

Entering Freshman or Advanced Student Scholarship

GRUEN ASSOCIATES SCHOLARSHIP, (\$1,800), to a male Afro-American student, resident of Los Angeles County, in Architecture.

Advanced Student Scholarships

DORMAN/MUNSELLE ASSOCIATES SCHOLARSHIP, (\$1,000), to a minority person, preferably Afro-American, in Architecture.

FREDERICK PETER YOUNG SCHOLARSHIP, (\$150), awarded Winter Quarter to a sophomore or junior in Architecture.

COMMUNICATIVE ARTS AND HUMANITIES

Advanced Student Scholarships

CROWN ZELLERBACH FOUNDATION SCHOLARSHIP, (\$500), to a junior or senior in Graphic Communications.

JOHN HEALEY SIGMA DELTA CHI SCHOLARSHIP, (\$100), to a sophomore or junior in Journalism.

JOHN B. LONG MEMORIAL SCHOLARSHIPS, (\$200), to juniors in Graphic Communications available through the California Newspaper Publishers Association (2).

ENGINEERING AND TECHNOLOGY

Entering Freshman or Advanced Student Scholarship

WALTER WELLS, SR. MEMORIAL SCHOLARSHIPS, (\$500), to students in Engineering (10).

Entering Freshman Scholarship

U.S. ELECTRICAL MOTORS DIVISION OF THE EMERSON ELECTRIC MANUFACTURING COMPANY SCHOLARSHIPS, (\$100), to a student in Electrical Engineering.

Advanced Student Scholarship

AERO ALUMNI ASSOCIATION SCHOLARSHIP, (\$100), to a junior or senior in Aeronautical Engineering.

AIR CONDITIONING REFRIGERATION CENTER OF LOS ANGELES SCHOLARSHIP, (\$400), to a senior in Environmental Engineering.

ALCOA FOUNDATION SCHOLARSHIP, (\$750), to a student in Engineering.

ALPAC SCHOLARSHIP, (\$350), to a junior or senior in Environmental Engineering.

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS SCHOLARSHIPS, (\$400), scholarships to seniors in Environmental Engineering (2).

AMERICAN WELDING SOCIETY, SAN DIEGO SECTION, SCHOLARSHIP, (\$250), to a junior or senior in Welding and Metallurgical Engineering.

AMERICAN WELDING SOCIETY, SANTA CLARA VALLEY SECTION, SCHOLARSHIPS, (\$100), to students in Welding and Metallurgical Engineering (2).

INSTITUTE OF ELECTRICAL & ELECTRONIC ENGINEERS, SANTA BARBARA SECTION, SCHOLARSHIPS, awards to students in Electronic Engineering or Electrical Engineering.

METALLURGICAL CONSULTANTS, INC. SCHOLARSHIPS, (\$150), to a junior and \$150 to a senior in Welding and Metallurgical Engineering.

MINNESOTA MINING AND MANUFACTURING SCHOLARSHIPS, (\$500), awards to students in Engineering (3).

NORTH AMERICAN HEATING AND AIR CONDITIONING WHOLESALE ASSOCIATION SCHOLARSHIPS, (\$350), to a student in Environmental Engineering.

LEO F. PHILBIN MEMORIAL SCHOLARSHIP, (\$100), to a junior or senior in Aeronautical Engineering.

CLARENCE RADIUS MEMORIAL SCHOLARSHIP, (\$350), to a student in Electronic Engineering.

RAYTHEON COMPANY SCHOLARSHIP, (\$500), to a junior or senior in Engineering.

LARRY REID SCHOLARSHIP, (\$250), to a senior in Mechanical Engineering.

SOLAR DIVISION OF INTERNATIONAL HARVESTER COMPANY AWARDS, \$100 awards juniors who have completed at least three quarters in Industrial Engineering, Mechanical Engineering, or Welding and Metallurgical Engineering (5). \$500 to a senior Engineering student who received one of the \$100 Solar awards as a junior.

WESTERN ELECTRIC FUND, (\$500), to a student in Engineering.

HUMAN DEVELOPMENT AND EDUCATION

Entering Freshman or Advanced Student Scholarship

SEARS-ROEBUCK FOUNDATION HOME ECONOMIC SCHOLARSHIPS, awards to students in Home Economics with preference to those planning to enter teaching or Home Economics careers in urban or rural poverty areas.

Advanced Student Scholarships

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN SCHOLARSHIP, (\$200), to a female student, 21 years or older, in Education, from San Luis Obispo County.

DELTA KAPPA GAMMA—EPSILON DELTA GRANT, (\$100), to a fifth year female student in Education.

JOHN AND DOROTHY MANNING SCHOLARSHIP, (\$200), to a junior or senior in Elementary Education.

PARENT-TEACHERS SCHOLARSHIPS, two \$500 awards to junior, senior, or graduate students in Elementary Education, and one \$500 award to a junior, senior, or graduate student in Secondary Education, who are preparing to teach in public schools of California, available from California Congress of Parents and Teachers, Inc.

GENERAL

Entering Freshman or Advanced Scholarships

ALUMNI ASSOCIATION ATHLETIC SCHOLARSHIPS, awards of up to \$500 to qualified students who participate in intercollegiate athletics.

CALIFORNIA STATE EMPLOYEES ASSOCIATION, CHAPTER 97, SCHOLARSHIPS, four \$225 awards, one each for a freshman, sophomore, junior and senior student. Preference given to applicants one of whose parents is an active, retired, or deceased CSEA member. Holders of a CSEA scholarship will have preference for renewal if current grade standing is acceptable.

CALIFORNIA STATE FIREMEN'S ASSOCIATION LADIES AUXILIARY SCHOLARSHIP, (\$300), to a student with a "B" average or better whose parent is a member in good standing of the Association.

Entering Freshman Scholarships

LULU G. BUMPFREY SCHOLARSHIP, (\$200), to a male graduate from Atascadero Union High School.

CALIFORNIA RURAL REHABILITATION CORPORATION EDUCATIONAL FUND SCHOLARSHIPS, (\$600), awards to students who are residents of California and members of low income farm and ranch families. Application must be filed with the Farm Home administration County Supervisor serving the county in which the applicant resides. This program has been established by the California State Department of Agriculture and the United States Department of Agriculture Farm Home Administration.

SAN LUIS OBISPO COUNTY COWBELLS SCHOLARSHIPS, one \$100 award and one \$200 award to female students in Agricultural Business Management, Animal Science, Journalism (Agricultural), or Home Economics, who have an interest in the promotion of the use or production of beef. Applicants must be graduates of a San Luis Obispo County high school and residents of the County for one year.

Financial Aid

Advanced Student Scholarships

APPLEGARTH BIOLOGY SCHOLARSHIP, (\$100), to a student in Biological Sciences.

CALIFORNIA STATE POLYTECHNIC COLLEGE WOMEN'S CLUB SCHOLARSHIP, (\$200), to a senior student.

INTER-FRATERNITY COUNCIL ATHLETIC SCHOLARSHIP, (\$300), to a sophomore showing excellence in Varsity Football.



JULIAN A. MCPHEE AWARD, (\$200), is awarded to an outstanding undergraduate student who has attended the College for at least six quarters as a full-time student. This award was established in memory of Julian A. McPhee, President of California State Polytechnic College from 1933 to 1966.

OTHER SCHOLARSHIPS

In addition to the scholarships awarded by the College, the following awards from various private donors and organizations are available to assist students in meeting college expenses. Interested students should make inquiries for such awards directly to the sponsoring organization or to the Placement and Financial Aid Office.

American Institute of Architects, Santa Barbara Chapter, Award (Architecture)

Bank of America, N.T. & S.A. Scholarships (Agriculture)

Bank of America Minority Scholarships (Education)

Business and Professional Women's Club of San Luis Obispo Scholarship

California Seed Association Scholarship (Agriculture)

Theresa Corti Scholarships (Agriculture)

H. S. Crocker Company—Roland Meyer Scholarship (Graphic Communications)

Dr. Albert Gazin Award (Architecture)

International Brotherhood of Electrical Workers Founders' Scholarships (Electrical Engineering)

ROTC Scholarships (Military Science)

Rotary Scholarships

Safeway Stores, Inc. Scholarships (Agriculture)

Santa Barbara Scholarship Foundation Grants

Santa Fe Scholarship (Agriculture)

South San Francisco and Stockton Union Stockyards Company Scholarships (Agriculture)

Southern Counties Gas Company and Southern California Gas Company Awards (Architecture)

Standard Oil Company of California Scholarships (Agriculture)

Union Oil Company Scholarships (Industrial Technology)

Union Pacific Railroad Scholarships (Agriculture)

NATIONAL DEFENSE STUDENT LOAN PROGRAM

The College participates with the Federal Government and the State of California in making available loans to students under provisions of the National Defense Education Act.

Entering freshmen as well as students in advanced standing in any field of study are eligible, although the law provides that special consideration shall be given to students with superior academic background who express a desire to teach in elementary or secondary schools.

The maximum loan to one individual is \$1,000 in any one academic year, and no more than \$5,000 total. Loans must be repaid with 3 per cent interest over a period of 10 years beginning one year after the individual ceases to be a full-time student at an institution of higher education. However, a borrower may have 10 per cent of the loan, and the interest thereon, cancelled for each full year of full-time public elementary or secondary school teaching, up to a maximum of 5 years and 50 per cent of the loan. Additional cancellation privileges are available for certain borrowers.

The deadline for submitting National Defense Student Loan Applications for the following school year is June 1.

STUDENT GUARANTEED LOAN PROGRAM

Federally-sponsored long-term loan programs with largely the same terms as the National Defense Student Loan Program, but with no teacher cancellation provisions. For families with annual income under \$15,000, an agency of the federal government will pay all of the interest while the student is in school.

UNITED STUDENT AID FUND

United Student Aid Fund is a private non-profit corporation which endorses low-cost loans by participating banks to college students. The College participates in this program by providing a specified amount of matching funds which allows the College to recommend students for such bank loans. Students who have completed their freshmen year may borrow from a bank up to \$1,000 a year at 7 per cent simple interest with repayment beginning after graduation or separation from college. For a student who qualifies under federal law, the federal government will pay all the interest until payments are due to begin.

Other organizations and funds also have provided matching amounts which make possible recommendation of additional student loans, some of them to specified categories of students. These organizations and funds (many of which also make student loans directly) are:

Alpha Zeta Loan Fund
 Alumni Association Loan Fund
 Architecture (A.I.A.) Fund
 Baer-Beck Fund
 California Cowbells, Inc.
 California State Polytechnic College
 Foundation
 Joseph Cardani Memorial Loan Fund
 Class of 1964 Loan Fund
 Thomas W. Flower Memorial Fund

Green and Gold BBQ Fund
 Jack Bertram and John Lee Loan Fund
 Roy F. Metz Memorial Loan Fund
 Clarence Radius Memorial Fund
 Larry Reid Loan Fund
 James Ritchie Loan Fund
 Norman Sharpe Fund
 Lester Whitney Memorial Fund
 California State Polytechnic Women's
 Club Fund

STUDENT LOAN FUNDS

Student loan funds are available to provide temporary assistance to worthy students. Loans from these funds are made for varying periods of time, according to regulations determined by a faculty committee and in conformance with conditions prescribed in the establishment of the particular loan fund. Applications may be obtained from the Financial Aid Counselor, Administration 213.

The character and integrity of the student are the primary qualifications for obtaining a loan. Evidence of real need for such temporary assistance must be shown. Students who have spent funds far beyond the necessary school expenses will not be considered for loans, even though need is shown.

Financial Aid

Agricultural Engineering Society Loan Fund
Alpha Zeta Loan Fund
Alumni Association Loan Fund
American Society of Heating, Refrigerating
and Air Conditioning Engineers Loan Fund
Pete Bachino Memorial Loan Fund
Baer-Beck Fund
Edgar E. Bilodeau Loan Fund
Jed S. Blake Memorial Loan Fund
California Association of Refrigeration Service
Engineers Loan Fund
California Association of Soil Conservation
Districts Loan Fund
California Polytechnic Memorial Loan Fund
California Retired Teachers' Loan Fund
California State Polytechnic Women's
Club Fund
W. B. Camp Revolving Scholarships in
Agricultural Journalism
W. B. Camp Educational Loan Fund
Margaret Chase Memorial Loan Fund
Thomas Comer Memorial Loan Fund
Harlan Diedrichson Fund

Court Evergreen, Independent Order of
Foresters Loan Fund
Anita M. Hathway Fund
Ralph Hoover Memorial Loan Fund
Horseshoeing and Animal Husbandry Loan
Fund
International Students Emergency Loan Fund
Chris Jespersen Fund
Kema Fund
Fred Kimball Loan Fund
William Kirkpatrick Memorial Loan Fund
Lee Gird Levering Memorial Loan Fund
Lynn T. Lobaugh Memorial Loan Fund
William Mercer Memorial Loan Fund
1960 Football Team Memorial Fund
Rotary Club Fund
Sears Roebuck Foundation Loan Fund for
Foreign Students
George Sehlmeier Memorial Fund
Telegram Tribune Loan Fund
Todd Farm Bureau Emergency Loan Grant
Wilder Memorial Loan Fund
Wrasse Fund

EDUCATIONAL OPPORTUNITY GRANT PROGRAM

A grant-in-aid program intended to assist undergraduate students who, without substantial aid such as this, could not attend college. Eligibility is restricted to students from families with very low income. The aid must be matched by a National Defense Loan or similar aid.

Educational Opportunity Grant applicants must submit a Parents' Confidential Statement of Financials.

LAW ENFORCEMENT EDUCATIONAL GRANT PROGRAM

Grants for the mandatory fees required by the College are made available to in-service law enforcement officers through a Federal program. Applicants may enroll on a full or part-time basis and must agree to serve in the employing agency for a period of at least two years following completion of their studies.

Under provisions of the Alan Pattee Scholarship Act required fees and tuition are waived upon application for students who are surviving children of a law enforcement or fire suppression officer killed in the performance of his duties.

MERLE HAMBLY FUND PROGRAM

A fund established by the California State Polytechnic College Student Wives Club provides for grants to assist the married student whose child has met with an accident or otherwise requires immediate medical care of an emergency nature.

STATE AID TO THE PHYSICALLY HANDICAPPED

The State of California, through its Bureau of Vocational Rehabilitation, provides financial assistance to students who have physical disabilities. This assistance equals the necessary school expense and may include an additional amount to help cover the cost of living. Students who may be entitled to the assistance should apply to the State Bureau of Vocational Rehabilitation.

FEES AND EXPENSES

STATE FEES

Materials and service fee (per quarter):	
(1-3.9 units)	\$26.50
(4-7.9 units)	30.00
(8-11.9 units)	33.00
(12 and more units)	39.00
Nonresident tuition—U.S. (\$1,480 annual maximum):	
For 14½ units or more (per quarter)	370.00
For less than 14½ units (per quarter per unit or fraction of unit)	25.00
*Nonresident tuition—Foreign (\$1,480 annual maximum):	
For 14½ units or more (per quarter)	370.00
For less than 14½ units (per quarter per unit or fraction of unit)	25.00
Facilities fee (non-State funded), per quarter	2.00
Identification card fee (each student, per quarter)	0.50
Late registration fee	5.00
Transcript of record (no charge for first copy)	1.00
Course credit by special examination fee (per unit)	1.00
Summer session fee (per quarter unit)	16.00
Extension course fee (per quarter unit):	
Lecture and discussion courses	12.75
Activity courses	16.25
Laboratory courses	25.25
Conference, Short Course or Institute, per person	Estimated Cost
Sponsored program fee (per week)	10.00
Application fee (not refundable)	20.00
Change of program fee	1.00
Failure to meet administratively required appointment or time limit	2.00
Library fees	See schedule in library
Check returned for any cause	2.00
† Parking fee (nonreserved spaces, per quarter)	9.00
Each alternate car in addition to fee for first vehicle	1.00
Special groups or sessions of one week or more, per week	1.00

Fees are subject to change upon approval by the Trustees of the California State Colleges.

* The rate of tuition required of each nonresident student who:

- (1) is a citizen and resident of a foreign country; and
- (2) was enrolled in the California State Colleges during the fall term of the 1970-71 college year; or who has been accepted for admission on or before November 24, 1970, to a State College for any subsequent semester or quarter to the 1970-71 college year; and
- (3) remains in continuance attendance as a full-time student at the California State Colleges, making normal progress toward a degree objective; and
- (4) has not been awarded a baccalaureate degree or graduate degree from the California State Colleges subsequent to the commencement of the fall term of the 1970-71 academic year;

shall be at the annual rate (four quarters) of \$800 per full-time student for all academic terms commencing prior to the 1974-75 fiscal year, and shall be at the rate of tuition charged nonresident students who are not citizens and residents of a foreign country for all academic terms commencing during the 1974-75 fiscal year and thereafter.

Commencing with the 1971 winter quarter at colleges on quarter system year-round operations, and with the 1971 spring semester at all other colleges, and for each term thereafter, the rate of tuition for each nonresident student who is a citizen and resident of a foreign country and who does not satisfy all of the foregoing provisions of the preceding paragraph shall be at the rate of tuition charged nonresident students who are not citizens and residents of a foreign country.

† Proportionate fees apply during summer session.

Fees/Expenses

OTHER FEES

(Subject to change)

Associated student card fee	
Summer quarter	\$5.00
Fall quarter	10.00
Winter and spring quarters, each	5.00
College union fee	
Each student enrolled for over six units	
Fall quarter	6.00
Winter and spring quarters, each	5.00
Summer quarter	4.00
Each student enrolled for six units or less	
Fall quarter	3.00
Winter and spring quarters, each	2.50
Summer quarter	2.00
Optional medical fee (per quarter)	9.00

LIVING EXPENSES FOR STUDENTS LIVING IN CAMPUS RESIDENCE HALLS

(Subject to change)

Room and Board	
Room, per quarter, annual license required	\$183.00
Board, per quarter (optional)	165.00 to 225.00
Housing security deposit (payable prior to occupancy)	20.00

Room payable in advance. Arrangements to pay in installments may be made upon application for campus housing. A service fee of \$4.00 per quarter shall be charged for the right to make installment payments.

Students are required to furnish blankets, bed spreads, and study lamps.

Two optional meal ticket plans are available. Plan 1 is a meal ticket providing 19 meals per week at a cost of \$600 per year or \$225 per quarter. Plan 2 is a meal ticket entitling the owner to his choice of any 12 meals each week at a cost of \$165 per quarter.

TYPICAL STUDENT EXPENSES

Following is an estimate of typical expenses per quarter for the average California resident student living in campus residence halls. Non-resident students should be prepared to pay additional tuition fees. Of the total amount, the student should be prepared to pay from \$130 to \$180, depending upon his major, at the time of fall quarter registration and approximately the same amount at the time of registration for other quarters.* Charges for room and board are payable in advance.

Associated student card (fall quarter, \$10.00, winter and spring quarters, \$5.00 each)	\$10.00
College union fee (fall quarter, \$6.00, winter and spring quarters, \$5.00 each)	6.00
Medical fee—optional (per quarter)	9.00
Materials and service fee (per quarter) (12 units or more)	39.00
Facilities fee	2.00
Room and board with optional annual meal ticket	383.00
Books and supplies (estimated)	75.00 †
Laundry (estimated \$10 per month)	30.00
Estimated total per quarter (approximately 3 months)	\$554.00

* Students enrolling under the auspices of an agency supplying educational assistance should check in advance with the appropriate agency representative regarding payment of fees and/or costs.

† Beginning engineering and architecture students should be prepared to pay up to \$150 in their first quarter.

STUDENT CONDUCT

It is expected that all California State Polytechnic College students are enrolled for serious educational pursuits and that they will conduct themselves so as to preserve an appropriate atmosphere of learning. It is also expected that all students who enroll at the College are willing to assume the responsibilities of citizenship in the campus community. Association in such a community is voluntary, and any student may withdraw from it at any time that he considers the obligations of membership disproportionate to the benefits. While enrolled, students are subject to college authority which includes the prerogative of dismissing those whose conduct is inimical to the aims of an institution of higher education.

While enrolled, students are subject to the regulations governing discipline stated in Title 5 of the California Administrative Code, Sections 41300, 41301, and 41302, and to such rules and regulations as have been approved and promulgated by authority of the College President. Copies of 5 Cal Adm Code 41301 and 41302, which deal specifically with student disciplinary regulations, are distributed during each registration period. Other applicable regulations are contained in this Catalog, in the College Administrative Manual, and in other official College publications.

Student Disciplinary Procedures

The Chancellor of the California State Colleges has established procedures for student disciplinary matters which are included in the College Administrative Manual, the official college publication of policies and procedures which is available in the college library for easy reference. A portion of the Manual which is relevant to student disciplinary matters is quoted below:

Educating students to their responsibilities as good citizens of the College and of the community is a college-wide responsibility requiring the cooperation and understanding of the entire College. Title 5 of the California Administrative Code assigns to the College President responsibility for enforcement of student disciplinary regulations. The College President has delegated to the College Hearing Officer the responsibility and commensurate authority to administer student disciplinary regulations but has retained decision-making authority on final appeals at the local college level.

When the conduct or behavior of a student is such that he is alleged to be in violation of applicable provisions of the Education Code, regulations of the Board of Trustees, and college rules and orders issued thereunder, the case is referred to the Disciplinary Coordinator for preliminary investigation of the facts leading to the allegation. If the preliminary investigation reveals that there is reason to believe that an infraction has been committed by a student of the College, disciplinary procedures as described in this Manual will be initiated.

Disciplinary Probation

Students on disciplinary probation may not participate on intercollegiate teams nor may they hold positions of leadership in student organizations or student government groups. This includes but is not limited to such groups as: athletic teams, music groups, debate teams, drama casts, judging teams, drill teams, Model U.N. delegation, rifle team, ASI councils, boards and committees. Such students may not hold an office in a student organization nor may they be editors, managers, or hold similar positions on student publications.

Student Involvement in Disciplinary Procedures

Student Government includes a judicial branch, the Student Judiciary, which rules on the constitutionality of student actions within the bylaws of the Associated Students. Student Hearing Boards conduct hearings in the residence halls with recommendations to the Disciplinary Coordinator or his designee.

In addition, students are represented on College Hearing Boards and College Appeal Boards which also include members of the faculty and the administrative staff and which make recommendations to the College Hearing Officer or to the College President, as appropriate in each case.

Student Conduct

Procedural Due Process

In all matters of student discipline, each person charged with a violation is given every courtesy, privilege, and right under the law and within the context of the uniqueness of a public institution of higher learning.

Causes for Disciplinary Action

Causes for disciplinary action are cited in Section 41301 of Title 5 of the California Administrative Code:

Expulsion, Suspension and Probation of Students. Following procedures consonant with due process established for the state college of which he is a student, any student of a state college may be expelled, suspended, placed on probation or given a lesser sanction for one or more of the following causes which must be state college related:

(a) Cheating or plagiarism in connection with an academic program at a state college.

(b) Forgery, alteration or misuse of state college documents, records, or identification or knowingly furnishing false information to a state college.

(c) Misrepresentation of oneself or of an organization to be an agent of a state college.

(d) Obstruction or disruption, on or off college property, of the state college educational process, administrative process, or other college function.

(e) Physical abuse on or off college property of the person or property of any member of the college community or of members of his family or the threat of such physical abuse.

(f) Theft of, or non-accidental damage to, state college property, or property in the possession of, or owned by, a member of the college community.

(g) Unauthorized entry into, unauthorized use of, or misuse of state college property.

(h) On state college property, the sale or knowing possession of dangerous drugs, restricted dangerous drugs, or narcotics as those terms are used in California statutes, except when lawfully prescribed pursuant to medical or dental care, or when lawfully permitted for the purpose of research, instruction or analysis.

(i) Knowing possession or use of explosives, dangerous chemicals or deadly weapons on state college property or at a state college function without prior authorization of the state college president.

(j) Engaging in lewd, indecent, or obscene behavior on state college property or at a state college function.

(k) Abusive behavior directed toward a member of the college community.

(l) Violation of any order of a state college president, notice of which had been given prior to such violation and during the academic term in which the violation occurs, either by publication in the campus newspaper, or by posting on an official bulletin board designated for this purpose, and which order is not inconsistent with any of the other provisions of this Section.

(m) Soliciting or assisting another to do any act which would subject a student to expulsion, suspension or probation pursuant to this Section.

(n) For purposes of this Article, the following terms are defined:

(1) The term 'member of the college community' is defined as meaning state college Trustees, academic, non-academic and administrative personnel, students, and other persons while such other persons are on state college property or at a state college function.

(2) The term 'state college property' includes:

(A) real or personal property in the possession of, or under the control of, the Board of Trustees of the California State Colleges, and

(B) all state college feeding, retail, or residence facilities whether operated by a college or by a state college auxiliary organization.

(3) The term 'deadly weapons' includes any instrument or weapon of the kind commonly known as a blackjack, slung shot, billy, sandclub, sandbag, metal knuckles, any dirk, dagger, switchblade knife, pistol, revolver, or any other firearm, any knife having a blade longer than five inches, any razor with an unguarded blade, and any metal pipe or bar used or intended to be used as a club.

(4) The term 'behavior' includes conduct and expression.

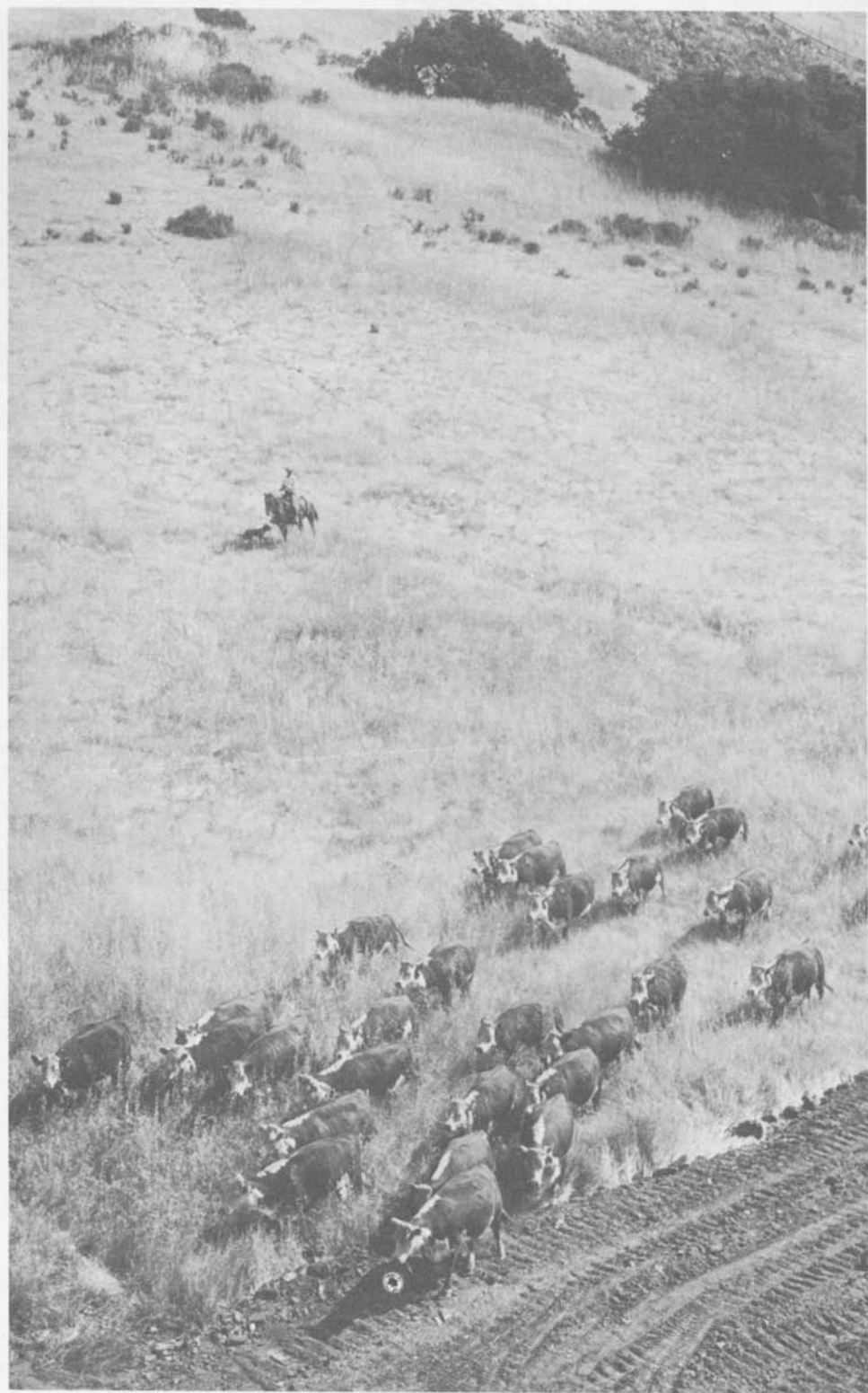
(o) This Section is not adopted pursuant to Education Code Section 23604.1.

(p) The provisions of this Section as hereinabove set forth shall only apply to acts and omissions occurring subsequent to its effective date. Notwithstanding any amendment or repeal pursuant to the resolution by which any provision of this Article is amended, all acts and omissions occurring prior to that effective date shall be subject to the provisions of this Article as in effect immediately prior to such effective date.

Among the specific causes for which the College will take such disciplinary action are: the bringing or drinking of alcoholic beverages on campus; being intoxicated on campus; being convicted by a public law enforcement agency of a misdemeanor involving moral turpitude, or of a felony, resulting from behavior which indicates that the student's presence on campus would constitute a threat to the safety or welfare of the college community; repeated violations of college rules and regulations, including those pertaining to driving and parking of vehicles.

Disciplinary action varies with the severity of the violation. If the unacceptable behavior involves use of motor vehicles, the student may be restricted from driving or parking on campus. If the unacceptable behavior involves matters pertaining to on-campus housing or dining, the student may be restricted from living or dining on campus.





SCHOOL OF AGRICULTURE AND NATURAL RESOURCES



CHART OF RECOMMENDED COMMUNITY COLLEGE PREPARATION FOR AGRICULTURE MAJOR CURRICULA

CAL POLY AGRICULTURE MAJORS REQUIRING VARIOUS COURSES ¹														
Recommended C. C. Preparation in Terms of Cal Poly Courses	Approximate units		Ag. Bus. Mgmt.	Ag. Engr.	Animal Sci.	Crops & Fruit	Dairy Sci.	Farm Mgmt.	Food Ind.	Mech. Ag.	Nat. Res. Mgmt.	Orn. Hort.	Poultry Ind.	Soil Sci.
	Qtr.	Sem.												
<i>Biological Sciences</i>														
Bio 110, Applied Biology.....	3	2		X	X	X	X	X		X	X	X	X	X
Bot 121, General Botany.....	4	3				X								X
Ent 126, Entomology.....	4	3			X	X	X	X			X	X	X	X
Zoo 131, General Zoology.....	4	3			X	X	X	X			X	X	X	X
Zoo 132, General Zoology.....	4	3							X					
Bact 221, Bacteriology.....	4	3												
Life Science.....	7	5	X											X
<i>Physical Sciences</i>														
Phys 104, Introductory Physics.....	4	3							X	X				
Phys 121-2-3, Physics.....	12	8												
Phys 131-2-3, Physics for Engrs.....	12	8		X	X	X		X	X		X		X	X
Chem 121-2, 226, Inorganic & Organic.....	12	8	X	X										
Chem 121-2, Inorganic.....	8	5												
<i>Mathematics</i>														
Math 100-200, Basic Math.....	6	4							X					
Math 102-3, Alg. Math. or 113-14.....	6	4	X		X	X		X						X
Math 113-14, Algebra & Trig.....	6	4												
Math 117-141, Anal. Geo. & Calc.....	9	6		X										
<i>Agriculture & Supporting Courses</i>														
AE 121-2, Ag. Mechanics.....	4	3	X	X	X	X	X	X	X	X	X	X	X	X
AE 142, Ag. Power & Machinery.....	4	3	X	X	X	X	X	X	X	X	X	X	X	X
SS 121, Soils.....	4	3	X	X	X	X	X	X	X	X	X	X	X	X
Ec 201 or 211, Economics.....	3	2	X	X	X	X	X	X	X	X	X	X	X	X
Acctg 131-2, or 221-2 Accounting.....	6	4	X	X	X	X	X	X	X	X	X	X	X	X
Ag Major or Related Courses.....	18	12	X	X	X	X	X	X	X	X	X	X	X	X
<i>Subtotals (Semester Units)</i>	--	--	41	41	44	44	41	42	39	43	41	45	44	41
<i>General Education Courses²</i>	--	--	29	29	26	26	29	28	31	27	29	25	26	29
<i>Maximum Transfer Units</i>	105	70	70	70	70	70	70	70	70	70	70	70	70	70

¹ The prospective transfer student should consult the curriculum requirements specified in this catalog for his particular major, including possible options and concentrations.
² Recommended courses include English, American History, American Government, Psychology, Speech, Literature, Physical Education and Health, etc.

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES

J. Cordner Gibson, Dean

John W. West, Associate Dean

The School of Agriculture of the College prepares students in the field of agriculture with the main objective of giving them a full and broad understanding of basic factors involved in production, management, processing, distribution, marketing, sales and services in the fields of related business, to make efficient operators and managers. While the school stresses production techniques and basic management to benefit to the fullest extent those returning to the farm or entering employment in agricultural fields upon leaving college, it also requires a core of basic sciences related to the production courses of the major and a substantial block of general education subjects necessary to prepare the student to take his rightful place in a democratic society.

This preparation also provides the sound basis necessary for the student desiring to become a teacher of agriculture in California's secondary schools.

Curricula in the School of Agriculture are arranged so that a student receives a maximum of production courses in his major field early in the program. This means that even if a student terminates his formal education at any time prior to his graduation, he has acquired a background of fundamentals which makes him immediately employable in the occupational field of his choice. This system of taking production courses early in the curriculum makes it possible for the student to determine in a short time whether or not he is fitted for the curriculum he has selected. In addition, the early acquisition by the student of practical "doing" types of activities provides him with the incentive to learn the basic scientific explanations.

The School of Agriculture uses the California State Polytechnic College Foundation program of student projects to provide additional experience and practice to supplement regular production courses. This practical experience leads to the understanding of production and managerial problems that are important in the overall training of a student in agriculture.

Admission to the School of Agriculture requires high school graduation, with appropriate test scores and grades, but does not require a specific pattern of courses taken in high school. However, a student who anticipates enrolling in the School of Agriculture will find a strong background in mathematics and physical and biological sciences advantageous.

Curricula are offered in the following majors in the School of Agriculture: agricultural business management, agricultural engineering, animal science, crop science, dairy science, farm management, food processing, fruit science, mechanized agriculture, natural resources management, ornamental horticulture, poultry industry, and soil sciences.

The Agricultural Education Department provides an additional program of courses required of prospective secondary agriculture teachers.

The Veterinary Science Department offers courses which support the animal production majors.

The courses offered in each agricultural curriculum may be grouped into four areas as follows:

1. Major agriculture—The required sequence of courses offered by the department in which the student expects to graduate. These courses constitute the core instruction leading to specific preparation for the production field of the student's choice.
2. Related agriculture—Supporting courses in agriculture selected from closely allied fields. They supplement the major agriculture block in (1).
3. Science and mathematics—Courses selected from scientific fields which provide basic biological, physical and social science, and mathematical background and support to the agricultural block in (1) and (2) above.
4. Humanistic-social—Courses which provide cultural background for intelligent living in a complex world society.

MASTER OF SCIENCE IN AGRICULTURE

The School of Agriculture offers a program of graduate study leading to the degree of Master of Science in Agriculture. This broadly-based program is designed to develop professional competencies for positions in agriculture and related industries, teaching, business, and government work which now require levels of preparation beyond the baccalaureate degree. Specializations are currently available in the areas of General Agricultural Sciences, International Agriculture, and Soil Conservation.

CURRICULUM FOR THE MASTER OF SCIENCE IN AGRICULTURE DEGREE
WITH A SPECIALIZATION IN GENERAL AGRICULTURAL SCIENCES

(For College requirements see the *Graduate Study Bulletin*)

	Units
A. Courses in area of specialization	24
1. The 24 units of 400 and 500 series courses must be distributed among a minimum of three departments in the School of Agriculture and Natural Resources. Fifteen units must be at the 500 level.	
B. Courses other than in the area of specialization	15
1. These are to be selected from 300-400-500 series courses as approved by the student's graduate adviser or committee from such areas as Agricultural Education and Education. Eight units must be at the 500 level.	
C. Electives from 300-400-500 level courses.....	6
	<hr/> 45

CURRICULUM FOR THE MASTER OF SCIENCE IN AGRICULTURE DEGREE
WITH A SPECIALIZATION IN INTERNATIONAL AGRICULTURE

(For College requirements see the *Graduate Study Bulletin*)

	Units
A. Courses in the area of specialization:	
ABM 515 International Agricultural Marketing	3
ABM 516 Communication for Change in Developing Countries.....	3
FM 520 World Agricultural Development	3
Courses in agriculture at the 500 level as approved by the student's graduate committee, at least 8 units:	8
Courses in agriculture to be chosen from the 300 level or above.....	7
	<hr/> 24
B. Courses outside the area of specialization	
AgEd 580 Special Problems in Agricultural Education.....	3
SocSc 590 Seminar in Social Sciences	3
Courses selected from the following: Geography, Political Science and History of one selected world regional area (Latin America, Africa south of the Sahara, North Africa and the Middle East, or Asia and the Far East), 300 or 400 level courses as approved by the student's graduate committee. The student must develop and demonstrate language competency as required by his graduate committee	9
C. Electives from 300, 400, and 500 level courses	6
	<hr/> 45

CURRICULUM FOR THE MASTER OF SCIENCE IN AGRICULTURE DEGREE WITH A SPECIALIZATION IN SOIL CONSERVATION

(For College requirements see the *Graduate Study Bulletin*)

A. Courses in the area of specialization:	Units
NRM 502 Resource Conservation	3
SS 508 Conservation Legislation	3
SS 521 Soil Morphology	3
SS 581 Graduate Seminar in Soils	3
SS 582 Graduate Seminar in Land Management	3
SS 599 Thesis or Internship	9
	<hr/> 24
B. Courses other than in the area of specialization:	
Courses to be selected from the 300-400-500 series outside the area of specialization and approved by the student's graduate committee.	
At least six units must be in 500 level courses	15
C. Electives from 300, 400, and 500 level courses	6
	<hr/> 45

TECHNICAL CURRICULA IN AGRICULTURE

In keeping with the collegewide policy of offering major courses which lead to occupational competency from the beginning of the first year of the four-year sequence, it is essential to provide opportunity for students who may find it impossible to complete four-year programs, to obtain as early as possible a concentration of production courses with a minimum of supporting material.

A technical two-year curriculum is available in each of the following agriculture areas: agricultural business management, mechanized agriculture, animal science, dairy husbandry and manufacturing, farm management, crops science, fruit science, food processing, ornamental horticulture, poultry industry, and soil science. These curricula include a smaller number of units of related and general education courses than are included in the degree programs. This permits the student to acquire the basic fundamentals in the major of his selection and a greater freedom of choice of subjects in agricultural production courses. A student not wishing to enroll in a degree curriculum will find that a two-year curriculum offers a maximum opportunity to select courses which will greatly assist him in agriculture after graduation. For admission requirements see "Requirements for Admission as an Undergraduate Student."

Upon completion of 98 selected units, a student may receive a technical certificate in the field of his major.

A student enrolled in the technical program will not be allowed to enroll for credit in any 300 or 400 series courses except when prior approval has been obtained by petition for special consideration.

The following is the two-year technical curriculum for animal husbandry. Other majors follow a similar pattern. Detailed curriculum information is available from the Dean of the School of Agriculture and department heads.

Freshman	F	W	S
Feeds and Feeding (ASci 101)	4		
Market Beef Production (ASci 121)	4		
Elements of Swine Production (ASci 122)		4	
Elements of Sheep Production (ASci 123)			4
Agricultural Mechanics (AE 121, 122)		2	2
* Applied English Composition (Eng 100)	3		
Agricultural Math (Math 102)		3	
Physical Education Activity (PE 141)	½	½	½
* Agricultural Biology (Bio 100)		3	
Soils (SS 121)			4
Electives	5	4	6
	<hr/> 16½	<hr/> 16½	<hr/> 16½

* These courses are taken in place of the required courses in the same subject matter fields listed in the degree curricula in the first two years and may not be used as credit toward a degree. VS 100 is replaced by CrSc 100 for plant majors.

All two-year technical students are required to take Math 102. Students in Mechanized Agriculture are required to take Math 102 and 103.

Agriculture

Sophomore	F	W	S
Sheep Husbandry (ASci 221)	4		
Commercial Beef Production (ASci 222)		4	
Swine Management (ASci 223)			4
Agricultural Power and Machinery Management (AE 142)	4		
* Prin. of Livestock Hygiene and Sanitation (VS 100)		5	
Forage Crops (CrSc 123)			4
* Farm Records and Farm Mgt. Practice (FM 102)	4		
Health Education (PE 107)			2
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
* U.S. Hist. and Government (Pol Sc 100)		3	
Farm Management or ABM Elective	3		
Electives	1	4	5
	<u>16½</u>	<u>16½</u>	<u>15½</u>

A student enrolled in the technical program may not transfer to a degree program except by following the approved college procedure for such transfers.

The following specialization areas are available to two-year technical students in Animal Science: Beef Cattle Production, Horse Production, Feed Mill Operation. One of these may be selected with the approval of the adviser.

HORSESHOEING

The Animal Science Department offers a 12-week course in horseshoeing in the fall and spring quarters.

AGRICULTURAL ENTERPRISE PROJECT FACILITIES

The entire farm with its equipment, buildings, and livestock is available to students for their use in conducting a wide variety of agricultural enterprise projects.

The college foundation has some of the best breeding flocks and herds of livestock in the State. Many show champions have come from the beef herd, which includes Herefords, Angus, and Shorthorns, offsprings of which are sold to the students. All necessary equipment for beef cattle production—barns, dehorning and loading chutes, corrals, stock horses, etc., is available.

The college foundation swine herd consists of two major breeds—Yorkshires and Hampshires. The facilities include a 12-unit farrowing house and outside lots and pastures for the brood sows. In addition there are 20 feeder units for student projects having a capacity of approximately 20 market hogs per unit. Student projects market between 700 and 800 fat market hogs each year.

The foundation breeding flock of sheep is made up of four breeds—Hampshire, Suffolk, Corriedale, Southdown. From 20 to 40 breeding ewes are maintained in each of the breeds, giving the students an opportunity of carrying on typical purebred breeding operations. There are student project facilities for approximately 400 to 500 market lambs that are fed for market each year. Students also have the opportunity of learning shearing and care of wool as well as lamb production.

The dairy herd includes purebred Jerseys, Guernseys, and Holsteins. Equipment includes all the necessary facilities for feeding and milking, care of calves and bulls, artificial insemination, milk testing, bottling, separating, and creamery operations. Students conducting dairy projects carry out their operations on a separate part of the college farm.

The poultry flock consists of between 3,500 and 4,000 birds. The equipment includes a modern incubator, egg-handling facilities, brooders and brooder houses, pens for trap-nesting and pedigree work, and related devices. A student assistant and the students themselves care for every operation under the supervision of the department head.

* These courses are taken in place of the required courses in the same subject matter fields listed in the degree curricula in the first two years and may not be used as credit toward a degree. VS 100 is replaced by CrSc 100 for plant majors.

All two-year technical students are required to take Math 102. Students in Mechanized Agriculture are required to take Math 102 and 103.

The Ornamental Horticultural Department occupies a unit consisting of eight greenhouses and three lath houses together with a sales unit and two large labs used for nursery instruction. Student projects are operated in all phases of nursery work. Equipment includes all of the essential machinery necessary for operation of a modern unit.

The Crop Science Department is well equipped with all types of machinery found on mechanized farms in California. All of the farming operations are carried on by students under the supervision of the Crops and Farm Departments through project class work or paid student labor. Orchards, vineyards, crop land, fruit and vegetable packing facilities and marketing outlets are available for instructional purposes.

The Agricultural Engineering Department operating and servicing all of the mechanized equipment at the college has many opportunities for students to learn practical farm machinery maintenance and repair. The major part of the maintenance work is handled by students under faculty supervision.

AGRICULTURAL EDUCATION DEPARTMENT

Department Head, H. H. Burlingham

Osmond S. Gilbertson

Larry P. Rathbun

The primary function of the Agricultural Education Department is to provide for the preparation of teachers of agriculture for the public secondary schools of California. Specialized pre-professional and professional courses are offered for undergraduate and graduate students. The basic technological, scientific, and broad general education course work for agriculture teaching candidates is offered throughout the School of Agriculture and other schools of the college.

Undergraduate students interested in preparing to become teachers of agriculture must enroll in an agriculture major and obtain a B.S. degree in agriculture. The undergraduate major may be selected in any of the agricultural science, production or management fields. Graduate students will enroll as majors in agricultural education.

Undergraduate agriculture teacher candidates will need to use judiciously the elective time available in the major curriculum to complete courses additionally required for the teaching credential which are not normally specified in the undergraduate major. A teaching minor in a single academic subject must be selected from those available at the college. Course work toward the minor should be started in the first or second year in order to incorporate these courses in the total curriculum of the student. Information on available minors may be obtained from the Agricultural Education office. Undergraduate students preparing for the teaching of agriculture will be advised primarily by an adviser in the selected agriculture major. They may pursue a program in agricultural education with the assistance and approval of their major department adviser in course planning and scheduling. Curriculum sheets showing such programs for each of the majors are available from department advisers and the Agricultural Education Office.

Guidance in course selection to meet teaching credential requirements in agricultural education is available through advisers in the Agricultural Education Office.

Candidates for the Standard Teaching Credential with a Specialization in Secondary Teaching will apply for admission to the teacher education program in agriculture according to the procedures outlined under the section **TEACHER PREPARATION PROGRAMS** of this catalog.

Information relative to the purposes, requirements, and procedures for the Master of Science in Agriculture Degree with a concentration in General Agricultural Sciences may be found in the introductory material for the School of Agriculture and Natural Resources.

See **COURSES OF INSTRUCTION** section of this catalog for description of courses in Agricultural Education and other subjects.

AGRICULTURAL ENGINEERING DEPARTMENT

Department Head, Lloyd H. Lamouria

James Bermann
Edgar J. Carnegie
Frank G. Coyes
John E. Dunn
Larry J. Glass

Robin R. Grinnell
Willard H. Loper
Robert M. Matheny
John L. Merriam
Clive O. Remund
Glenn W. Rich

Glenn W. Salo
Rollin D. Strohman
Henry Waelti
James P. Webster
Gerald L. Westesen
James B. Zetzsche, Jr.

A student in this department may choose one of two majors.

Agricultural Engineering. This major prepares students for engineering positions with farm machinery and equipment companies, manufacturers and distributors of irrigation equipment, government agencies such as the Soil Conservation Service and other positions requiring technical training in Agricultural Engineering.

Mechanized Agriculture. This major gives the student broad agricultural training with emphasis on the applied mechanical phases of agriculture. This curriculum is intended for the student who plans to own or manage a farm, teach vocational agriculture with emphasis on farm mechanics, or do sales and service work (manufacturing, wholesale or retail) in the farm machinery and equipment field.

This department also gives training in the mechanical and engineering phases of agriculture to students majoring in other departments of the School of Agriculture.

Two buildings containing eight shops and laboratories and two classrooms, together with a large modern farm machinery and equipment building provide excellent facilities. A wide variety of makes, models, and types of tractors and farm machinery is available for class use and students are provided with ample opportunity for the application of mechanical and engineering know-how to practical production problems in using thousands of acres of college farm as a laboratory.

The curriculum in agricultural engineering is recognized as a professional curriculum by the American Society of Agricultural Engineers. The student branch of the ASAE offers an active program of professional and extra-curricular events. Enterprise project activity is also available and encouraged.

Students interested in the two-year technical certificate in Mechanized Agriculture should refer to the introductory statement for the School of Agriculture which describes this program. Detailed curriculum information is available from the department head.

CURRICULAR CONCENTRATIONS IN AGRICULTURAL ENGINEERING

Power and Machinery

A combination of engineering and agricultural courses designed to provide graduates with a technical and practical background for employment in the agricultural-utility power and equipment field. Opportunities are available in such diverse areas as prime movers, soil conditioning and moving equipment, utility equipment, harvesting and product handling equipment, as well as agricultural structures and products processing.

Soil and Water

A combination of engineering and agricultural courses designed to provide graduates with a technical and practical background for employment in the field of soil and water. Water management opportunities are available in such areas as irrigation, drainage, hydrology, flood control, research, and administration.

CURRICULAR CONCENTRATIONS IN MECHANIZED AGRICULTURE

Teaching and Service

For those students interested in teaching agriculture, serving the branch house and dealer operations, and corporate and family farm and ranch equipment maintenance.

Manufacturing

For those students supporting job-shop and specialized equipment manufacturing operations.

Agricultural Engineering

Management and Sales

For those students joining large scale agricultural units involving field and processing operations and for those students serving the wholesale-retail merchandising and rental-leasing of equipment.

CURRICULUM IN AGRICULTURAL ENGINEERING

Freshman	F	W	S
Introduction to Agricultural Engineering (AE 100).....	1		
Agricultural Mechanics (AE 128).....	2		
Power and Machinery (AE 143).....		4	
Engineering Surveying (AE 237).....			2
Analytic Geometry and Calculus (Math 141, 142, 143).....	4	4	4
Freshman Composition (Eng 104, 105).....	3	3	
Applied Descriptive Geometry (ET 141).....		2	
Engineering Drawing Systems (ET 142).....			2
Manufacturing Processes (MP 141, 142).....	1		1
Plant production elective.....	4		
Soils (SS 121).....			4
Health Education (PE 107).....	2		
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
General Inorganic Chemistry (Chem 121, 122).....		4	4
	<hr/> 17½	<hr/> 17½	<hr/> 17½
Sophomore			
Agricultural Structures Planning (AE 232).....			3
Principles of Irrigation (AE 236).....	4		
Engineering Surveying (AE 238).....	2		
General Biology (Bio 101).....		3	
Analytic Geometry and Calculus (Math 241).....	4		
Differential Equations (Math 242).....		4	
General Physics (Phys 131, 132, 133).....	4	4	4
Engineering Mechanics (ME 211, 212).....		3	4
Public Speaking (Sp 201).....			2
Report Writing (Eng 218).....		3	
Economics (Ec 201 or 211).....			3
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Fortran Program (CSc 101).....			1
Elem. Probability and Statistics (Stat 211).....	3		
Manufacturing Processes (WM 141, 142).....		1	1
	<hr/> 17½	<hr/> 18½	<hr/> 18½
Junior			
Hydraulics (AE 312).....	4		
Dynamic Measurement (AE 338).....		4	
Off-the-road Locomotion (AE 326).....			4
Electrical Circuit Theory (EE 201).....	4		
Engineering Economy (IE 403).....		3	
Strength of Materials Laboratory (Aero 229).....		1	
Thermodynamics (ME 302).....	3		
Engineering Properties of Agricultural Materials (AE 333).....			3
American Government (Pol Sc 201).....			3
Strength of Materials (Aero 207).....	5		
* Humanities elective.....			3
† Electives.....		8	4
	<hr/> 16	<hr/> 16	<hr/> 17

* To be selected in accordance with the General Education requirement.

† At least 18 units shall be selected with the approval of the adviser in a concentration. An additional 8 units must be selected from courses in the School of Agriculture.

Agricultural Engineering

Senior	F	W	S
Agricultural Structures Design (AE 433)	3		
Senior Project (AE 461, 462)	2	2	
Undergraduate Seminar (AE 463)			2
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
* Literature or Philosophy	3	3	
* Social Science elective (other than history)			3
† Electives	8	8	8
	16	16	16

CURRICULUM IN MECHANIZED AGRICULTURE

Freshman			
Introduction to Agricultural Engineering (AE 100)	1		
Agricultural Mechanics (AE 128)		2	
Agricultural Tractors and Equipment Skills (AE 141)	2		
Agricultural Power and Machinery Management (AE 142)			4
Algebra (Math 113, 114)	3	3	
Trigonometry (Math 115)			3
Computer Applications to Agriculture (AM 250)		2	
Freshman Composition (Eng 104, 105)	3	3	
Health Education (PE 107)	2		
Agricultural Drafting (AE 133)			2
Manufacturing Processes (MP 151, 141, 142)	1	1	1
Manufacturing Processes (WM 141, 142)		1	1
Fundamentals of Metallic Arc Welding (WM 155)			1
Plant production elective	4		
Soils (SS 121)		4	
Animal production elective			4
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	16 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$
Sophomore			
Agricultural Building Construction (AE 231)	3		
Agricultural Power Transmission (AE 234)	3		
Agricultural Power (AE 335)		3	
Engineering Surveying (AE 237, 238)		2	2
College Physics (Phys 121, 122, 123)	4	4	4
General Botany (Bot 121)		4	
Agricultural Business Sales and Service (ABM 201)	3		
Agricultural Business Credit and Finance (ABM 203)			3
* Humanities elective	3		
Public Speaking (Sp 201)			2
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
† Electives	1	4	6
	17 $\frac{1}{2}$	17 $\frac{1}{2}$	17 $\frac{1}{2}$
Junior			
Agricultural Equipment Projects (AE 344)		3	
Agricultural Products Handling (AE 323)			3
Agricultural Building Planning (AE 332)			3
Principles of Agricultural Machinery (AE 322)		3	
Irrigation (AE 340)	4		
General Inorganic Chemistry (Chem 121, 122)	4	4	
General Psychology (Psy 202)		3	
Report Writing (Eng 218)			3
Business Law Survey (Bus 301)			3
Economics (Ec 201 or 211)	3		
Farm Records (FM 321)	4		
† Electives	1	3	4
	16	16	16

* To be selected in accordance with the General Education requirement.

† At least 18 units shall be selected with the approval of the adviser in a concentration. An additional 8 units must be selected from courses in the School of Agriculture.

Agricultural Engineering

Senior	F	W	S
Agricultural Equipment Industry Management (AE 321).....		4	
Principles of Agricultural Electrification (AE 324).....	3		
Agricultural Electric Power and Controls (AE 325).....			3
Senior Project (AE 461, 462).....	2	2	
Undergraduate Seminar (AE 463).....			2
American Government (Pol Sc 201).....	3		
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 205).....			3
* Literature or philosophy.....	3	3	
† Electives	5	4	8
	16	16	16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Agricultural Engineering and other subjects.

* To be selected in accordance with the General Education requirement.

† At least 18 units shall be selected with the approval of the adviser in a concentration. An additional 8 units must be selected from courses in the School of Agriculture.



AGRICULTURAL MANAGEMENT DEPARTMENT

Department Head, Chase C. Wilson

J. Philip Bromley
Daniel C. Chase
Gaylord J. Chizek
Arthur C. Duarte
Warren S. Farrell

Jerry R. Flake
Douglas G. Genereux
George J. Gomes
Edgar A. Hyer
Robert E. McCorkle

Harold D. Morris
John A. Rogalla
Jack F. Scott
Duane O. Seaberg
Leslie J. Vanoncini

Two major curricula are offered by the Agricultural Management Department and are designed to prepare students for careers in agricultural business management or farm management.

Graduates in both the Agricultural Business Management and Farm Management majors have entered the fields of vocational agriculture teaching and agricultural extension service as well as government employment and agricultural industry.

Both majors are based upon a firm foundation in production agriculture as a basis for sound management preparation. Each program combines the agricultural and business training required for success in farm-related business careers or in farm management careers. The modern farmer is primarily a specialist who confines his operations largely to the production and management of crops and livestock. He depends upon farm-related businesses for increasing amounts of fertilizer, insecticides, machinery and equipment, commercial feeds, capital, and production supplies.

These two majors provide a large number of elective units so that a student may select a specific area of study to obtain either a broad background in agriculture or technical skills in specialized agricultural fields according to his interest and needs.

Interwoven throughout the curricula are general education courses in English, Economics, History, Mathematics, and Political Science which provide the basis for better citizenship and understanding of society.

AGRICULTURAL BUSINESS MANAGEMENT MAJOR

The Agricultural Business Management major prepares students for the many farm-related agricultural businesses and government agencies serving the farmer. Farm-related business functions involving agricultural products provide excellent career opportunities for those who are prepared in the business principles and procedures necessary for organizing, managing and representing the expanding farm-related businesses and industry.

FARM MANAGEMENT MAJOR

The Farm Management major prepares the student to operate and manage a farm or ranch. While the management of a farm should be the primary purpose of most students taking the curriculum, students also may plan to engage in allied work such as farm credit and farm appraisal or in management positions with agricultural enterprises.

CURRICULUM IN AGRICULTURAL BUSINESS MANAGEMENT

Freshman	F	W	S
Introduction to Agricultural Economics (AM 102).....	3		
Introduction to Agribusiness (AM 101).....		3	
Agricultural Business Organization (ABM 103).....			3
Mathematics (Math 102, 103 or 113, 114).....		3	3
Agricultural Mechanics (AE 121).....	2		
Freshman Composition (Eng 104, 105, 106).....	3	3	3
Physical Education Activity (PE 141).....	½	½	½
Health Education (PE 107).....			2
* Life Science.....	4		
** Electives.....	4	7	5
	16½	16½	16½

* To be selected in accordance with the General Education requirement.

** At least 36 units shall be chosen with the approval of the adviser from other fields of agriculture. Twelve of the 36 units must be in a single agriculture major.

Agricultural Management

Sophomore	F	W	S
Agricultural Business Sales and Service (ABM 201).....	3		
Agricultural Cooperative Organization and Management (ABM 202).....		3	
Agricultural Business Credit and Finance (ABM 203).....			3
Agricultural Business Machines Practice (ABM 241).....		1	
Principles of Accounting (Actg 221, 222).....	4	4	
Principles of Economics (Ec 211).....	3		
Agricultural Economics (AM 212).....		3	
Agricultural Marketing (AM 304).....			3
* Humanities elective.....	3		
Public Speaking (Sp 201).....	2		
Report Writing (Eng 218).....			3
Physical Education Activity (PE 241).....	½	½	½
* Life Science.....			4
Elementary Probability and Statistics (Stat 211).....		3	
Statistical Methods (Stat 212).....			3
** Electives.....		3	
	15½	17½	16½
Junior			
Agricultural Business Management and Government Policy (ABM 301).....	3		
Agricultural Business Sales Management (ABM 302).....		3	
Agricultural Property Management and Sales (ABM 321).....	4		
Advanced Agricultural Business Management (ABM 322, 323).....		4	4
General Psychology (Psy 202).....		3	
Advanced Public Speaking (Sp 202).....			2
General Inorganic Chemistry (Chem 121, 122).....	4	4	
Organic Chemistry (Chem 226).....			4
American Government (Pol Sc 201).....	3		
** Electives.....	3	3	6
	17	17	16
Senior			
Agricultural Labor Relations and Personnel Management (ABM 403).....			3
Agricultural Business Operations Analysis (ABM 421).....	4		
Wholesaling and Retailing Agricultural Commodities (ABM 412).....		3	
Agricultural Business Communication (ABM 402).....		3	
Senior Project (ABM 461, 462).....	2	2	
Undergraduate Seminar (ABM 463).....			2
* Literature or Philosophy.....		3	3
Business Law Survey (Bus 301).....	3		
Growth of American Democracy (Hist 204).....	3		
U.S. in World Affairs (Hist 205).....			3
** Electives.....	5	5	5
	17	16	16

* To be selected in accordance with the General Education requirement.

** At least 36 units shall be chosen with the approval of the adviser from other fields of agriculture. Six of the 36 units must be 300 or 400 level courses.

Agricultural Management

CURRICULUM IN FARM MANAGEMENT

	F	W	S
Freshman			
Introduction to Agribusiness (AM 101).....	3		
Introduction to Agricultural Economics (AM 102).....		3	
Agricultural Cooperative Organization (ABM 202).....			3
Mathematics (Math 113, 114).....		3	3
Freshman Composition (Eng 104, 105).....	3	3	
Public Speaking (Sp 201).....			2
Physical Education Activity (PE 141).....	½	½	½
Health Education (PE 107).....			2
Agricultural Business Machines (ABM 241).....	1		
**Life Science	4	4	
* Electives	5	3	6
	16½	16½	16½
Sophomore			
Computer Application to Agriculture (AM 250).....		2	
Agricultural Economics (AM 212).....		3	
Agricultural Economic Analysis (FM 203).....			3
Agricultural Marketing (AM 304).....			3
Agricultural Resources (FM 305).....		3	
Farm Records (FM 321).....	4		
Soils (SS 121).....	4		
Principles of Economics (Ec 211).....	3		
**Literature, Philosophy	3		3
Report Writing (Eng 218).....			3
Basic Accounting (Actg 131, 132).....		3	3
Elementary Probability and Statistics (Stat 211).....	3		
Statistical Methods (Stat 212).....		3	
Physical Education Activity (PE 241).....	½	½	½
* Electives		2	
	17½	16½	15½
Junior			
Farm Credit (FM 310).....	3		
Principles of Farm Management (FM 322).....	4		
California Agriculture (FM 325)		3	
Farm Appraisal (FM 326).....			4
Agricultural Price Analysis (FM 333)		3	
Crop Management Problems (FM 421).....			3
Agricultural Prices and Policy (FM 403).....	3		
General Psychology (Psy 202).....			3
General Inorganic Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226)			4
Business Law Survey (Bus 301).....		3	
* Electives	3	4	2
	17	17	16
Senior			
Linear Programming in Agriculture (FM 405)		3	
Farm Management Problems (FM 424, or FM 425, or FM 426).....	3		
Large Farm Accounting (FM 431).....	3		
Senior Project (FM 461, 462).....	2	2	
Undergraduate Seminar (FM 463).....			2
** Humanities elective	3		
American Government (Pol Sc 201).....	3		
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 205).....			3
* Electives	3	8	11
	17	16	16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Agricultural Management, Agricultural Business Management, Farm Management and other subjects.

* At least 40 units shall be chosen with the approval of the adviser from other fields of Agriculture. Nine of the 40 units must be 300 or 400 level courses.

** To be selected in accordance with the General Education requirement.

ANIMAL SCIENCE DEPARTMENT

Department Head, Richard F. Johnson

Russell K. Anderson	Frank W. Fox, Jr.	Robert D. Hooks
Richard J. Birkett	William R. Gibford	James W. Jacobs
Emmett A. Bloom	Robert E. Hadley	Lyle G. McNeal
L. LaVerne Bucy	Michael C. Hall	Kenneth C. Scotto
James R. Flanagan	Roy M. Harris	John V. Stechman
		Robert R. Wheeler

The objective of the Animal Science Department is to educate men for the occupation of farming where beef cattle, sheep, and swine enterprises are an important part of the industry. The majority of graduates from the department are engaged in the livestock and farming business or are employed as ranch foremen or managers.

Livestock feeding yards, feed mills, stockyard companies, meat packers, commission firms, and other organizations servicing the livestock industry are sources of employment for graduates. Other employment fields include agricultural teaching, agricultural extension work, and agricultural research. The Department allows wide latitude in the selection of elective courses so that a student may pursue a secondary emphasis area or broaden the cultural base of his total college education.

Further aims and objectives of the Animal Science Department are to give students practical training in livestock farming and range management. The department maintains herds of three breeds of beef cattle, four breeds of sheep, three breeds of swine, and Thoroughbred and Quarter horses. These are used for laboratory and field study of management, feeding, breeding, and marketing.

Students are encouraged to carry on a project program of feeding, management, and marketing livestock through facilities furnished by the California State Polytechnic College Foundation. Large numbers of beef, cattle, sheep, and swine are fed and marketed by students each year. An abattoir provides facilities for training in slaughtering of meat animals and cutting, curing, and grading of meats. Students interested in the two-year technical certificates should refer to the introductory statement for the School of Agriculture which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN ANIMAL SCIENCE

Freshman	F	W	S
Feeds and Feeding (ASci 101).....	4		
Market Beef Production (ASci 121).....		4	
Elements of Swine Production (ASci 122).....	4		
Elements of Sheep Production (ASci 123).....			4
Agricultural Mechanics (AE 121 or 122).....	2		
Freshman Composition (Eng 104, 105).....	3	3	
* Mathematics (Math 113, 114).....	3	3	
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
General Zoology (Zoo 131, 132).....		4	4
Health Education (PE 107).....			2
Public Speaking (Sp 201).....			2
Electives		2	4
	16½	16½	16½

* Math 102, 103 may be substituted for Math 113 with approval of adviser.

Animal Science

Sophomore	F	W	S
† Animal Science electives.....	4	3	
Agricultural Engineering electives (AE 131, 133, 138, 141, 142, 335)	2	2	
Anatomy and Physiology (VS 123).....		3	
Soil Science (SS 121).....			4
General Inorganic Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226).....			4
General Bacteriology (Bact 221).....	4		
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
General Botany (Bot 121).....		4	
Forage Crops (CrSc 123).....			4
Electives	2		3
	<hr/> 16½	<hr/> 16½	<hr/> 15½
Junior			
Applied Animal Nutrition (ASci 302).....		3	
Livestock Hygiene and Sanitation (VS 202).....	3		
Animal Parasitology (VS 203).....		3	
† Animal Husbandry electives.....			4
American Government (Pol Sc 201).....	3		
General Psychology (Psy 202).....			3
Genetics (Bio 303).....		3	
Economics (Ec 201 or 211).....	3		
Farm Records (FM 321).....		4	
Farm Management (FM 322).....			4
Biochemistry (Chem 328).....			4
Approved Business course.....	3		
Electives	4	4	2
	<hr/> 16	<hr/> 17	<hr/> 17
Senior			
Animal Breeding (ASci 304).....		3	
Reproductive Physiology (ASci 401).....	3		
Animal Nutrition (ASci 402).....		4	
Senior Project (ASci 461, 462).....	2	2	
Undergraduate Seminar (ASci 463).....			2
* Literature, Philosophy	3	3	
* Humanities elective			3
U.S. World Affairs (Hist 205).....			3
Growth of American Democracy (Hist 204).....	3		
† Animal Science electives			4
†† Management elective		3	
Electives	5	2	5
	<hr/> 16	<hr/> 17	<hr/> 17

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Animal Science and other subjects.

* To be selected in accordance with the General Education requirement.

† Minimum of 15 units to be selected from 200-300 series courses in ASci.

†† To be selected from any 300-400 series course in ABM or FM.

CROP SCIENCE DEPARTMENT

Department Head, Corwin M. Johnson

Charles B. Atlee

Gene P. Offermann

Frank P. Thrasher

H. Paul Fountain

Oscar E. Reece

William R. Troutner

George G. Gowgani

Howard Rhoads

Gordon L. Van De Vanter

James T. Hallett

Ralph M. Vorhies

Two major curricula are offered by the Crop Science Department and are designed to prepare students for field, fruit, or vegetable crop production and for employment in related service areas.

Graduates in both Crop Science and Fruit Science have attained responsible positions in agronomic and horticultural production, teaching, research, extension, quality control and inspection, and sales and service areas. Opportunities for employment in private industry and governmental sectors are available for those with practical knowledge of agricultural skills and techniques and a good background in the sciences and humanities.

The Department has 30 acres of productive citrus, grapes, and deciduous orchard with over 100 varieties represented. Additional non-bearing acreage for instructional use exists and new plantings are under way. About 170 acres are devoted to student production enterprises in field and vegetable crops. An additional 500 acres of college farm cropland provide opportunities to gain experience through part-time employment. All departmental majors are encouraged to gain experience and earn income by participation in the project enterprise program or by working for the college farm.

The technological phases of instruction are enhanced by packing and grading equipment, seed processing equipment, and specialized laboratory equipment for the study of various crops. Field trips supplement instruction for crops not common to the San Luis Obispo area.

Students interested in the two-year technical certificate should refer to the School of Agriculture introductory statement. The department head can supply additional information.

CROP SCIENCE MAJOR

A student in the Crop Science Major may elect to specialize in Agronomy, Vegetable Science, Plant Protection, or Agricultural Inspection in the junior and senior years. These concentrations permit a student to select courses which are specific to his major interest:

Agronomy Concentration

This specialty provides employment opportunity in private or corporate crop production and management, in sales and service, or as an agronomist with government or industry.

Vegetable Science Concentration

Specialization in this concentration provides employment opportunity in vegetable production and management, in sales and service, in governmental horticulture, or as production fieldmen.

Plant Protection Concentration

This concentration prepares the student for weed and pest control positions in sales and service, commercial pest control, and regulatory agencies dealing with agricultural chemicals and their use.

FRUIT SCIENCE MAJOR

The Fruit Science Major qualifies graduates for orchard or vineyard management or for related employment as fieldmen for packers or canners, fruit inspection, or plant protection. Instruction includes deciduous fruits, nut crops, citrus, avocados, grapes, berries, tropical and sub-tropical fruits, and minor fruit species. Students may elect to specialize in Fruit Science, Plant Protection, or Agricultural Inspection in the junior and senior years.

Crop Science

CURRICULUM IN CROP SCIENCE

Freshman	F	W	S
Concepts of Crop Production (CrSc 131).....	4		
Combine Harvest Crops (CrSc 132).....		4	
Row Crops (CrSc 133).....			4
Agricultural Engineering Elective	4		4
General Botany (Bot 121, 122 or 123).....	4	4	
Freshman Composition (Eng 104, 105).....		3	3
*Mathematics (Math 102, 103, 114).....	3	3	3
Health Education (PE 107).....	2		
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives		2	3
	17 $\frac{1}{2}$	16 $\frac{1}{2}$	17 $\frac{1}{2}$
Sophomore			
Weed Control (CrSc 221).....	4		
Commercial Seed Production and Processing (CrSc 231).....		4	
Vegetable Crops Production (VgSc 232).....			4
General Inorganic Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226)			4
Soils (SS 121).....	4		
Soil Management (SS 122).....		4	
Fertilizers (SS 221).....			4
Public Speaking (Sp 201).....			2
General Psychology (Psy 202).....	3		
Economics (Ec 201 or 211)		3	
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives	2		3
	17 $\frac{1}{2}$	15 $\frac{1}{2}$	17 $\frac{1}{2}$
Junior			
General Bacteriology (Bact 221).....	4		
Crop Technology (CrSc 322).....		4	
Farm Records (FM 321).....	4		
††Management Elective		4	
Biochemistry (Chem 328).....	4		
California Fruit Growing (FrSc 230).....			4
Plant Pathology (Bot 323).....			4
American Government (Pol Sc 201).....	3		
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 305).....			3
***Electives and courses to complete major.....	2	4	6
	17	15	17
Senior			
Plant Breeding (CrSc 304).....			4
Senior Project (CrSc 461, 462).....	2	2	
Undergraduate Seminar (CrSc 463).....			2
Genetics (Bio 303).....	3		
††Management Elective.....		3	
Principles of Insect Control (CrSc 311)	4		
** Literature, Philosophy	3	3	
** Humanities elective			3
***Electives and courses to complete major.....	4	8	6
	16	16	15

* Math 113 may be substituted for Math 102 and 103 with adviser approval.

** To be selected in accordance with the General Education requirement.

*** 18 of the elective units in the junior and senior years must be chosen with the approval of the adviser.

†† To be selected from any 300-400 series course in ABM, AM or FM.

CURRICULUM IN FRUIT SCIENCE

Freshman	F	W	S
Pomology (FrSc 131, 132, 133).....	4	4	4
*Mathematics (Math 102, 103, 114).....	3	3	3
Agricultural Engineering electives.....	2		4
Freshman Composition (Eng 104, 105).....	3	3	
Health Education (PE 107).....		2	
General Botany (Bot 121, 122 or 123).....	4	4	
Physical Education Activity (PE 141).....	½	½	½
Electives.....			6
	16½	16½	17½
Sophomore			
Viticulture (FrSc 231).....	4		
Fruit Plant Propagation (FrSc 232).....		4	
General Inorganic Chemistry (Chem 121, 122).....	4	4	
Organic Chemistry (Chem 226).....			4
Soils (SS 121).....	4		
Soil Management (SS 122).....		4	
Plant Pathology (Bot 323).....			4
Weed Control (CrSc 221).....			4
Public Speaking (Sp 201).....	2		
Agricultural Engineering electives.....	2		
Economics (Ec 201 or 211).....		3	
Physical Education Activity (PE 241).....	½	½	½
Electives.....		2	4
	16½	17½	16½
Junior			
Fruit Production (FrSc 331 or 332).....		4	
General Bacteriology (Bact 221).....		4	
Principles of Insect Control (CrSc 311).....	4		
Agricultural Code of California (CrSc 303).....		3	
Biochemistry (Chem 328).....		4	
Genetics (Bio 303).....	3		
Fertilizers (SS 221).....			4
Farm Records (FM 321).....	4		
Principles of Farm Management (FM 322).....			4
General Psychology (Psy 202).....	3		
Electives.....	3		9
	17	15	17
Senior			
Advanced Pomology (FrSc 421).....	3		
Plant Breeding (CrSc 304).....	4		
Senior Project (CrSc 461, 462).....	2	2	
Undergraduate Seminar (CrSc 463).....			2
Orchard Management (FrSc 436).....			4
General Field Crops (CrSc 230).....		4	
** Management Elective.....			3
American Government (Pol Sc 201).....	3		
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 205).....			3
†† Literature, Philosophy.....	3	3	
†† Humanities elective.....			3
Electives.....	1	4	1
	16	16	16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Crops Science, Fruit Science, Vegetable Crop Science and other subjects.

* Math 113 may be substituted for Math 102 and 103 with adviser approval.

** To be selected from any 300-400 series course in ABM, AM or FM.

†† To be selected in accordance with the General Education requirement.

DAIRY SCIENCE DEPARTMENT

Department Head, Harmon B. Toone

Harry G. Markos

Carl F. Moy

Gary D. Reif

Herman E. Rickard

The dairy curriculum is designed to prepare students for employment in the various phases of the dairy industry, including husbandry and manufacturing, as well as the related and allied fields. The basic curriculum is arranged to serve all students within the major with further courses included in the two options of husbandry and manufacturing to provide depth of instruction in either field.

The curriculum provides adequate elective units under either option for students to select additional courses in the sciences, business, education, or other areas of their choice to prepare them for advanced degrees in the field, teaching, or the business world of the dairy industry. Recommendations in these various areas will be given by staff advisers.

Excellent facilities are provided for students selecting either of the options. The dairy herd includes purebred Jerseys, Guernseys, and Holsteins, located on a well-planned unit, where feeding, milking, calf raising, artificial insemination, and management are carried out. The college creamery is a new and modern plant, well equipped with the most modern processing equipment. Students are employed on a part-time basis to work in both the production and processing areas. A separate dairy located on campus provides an opportunity for students with dairy projects. This farm accommodates 80-100 head of project cattle owned and cared for by students. There are two 12-unit dormitories at this project farm.

CURRICULAR OPTIONS

Husbandry

The Dairy Husbandry Option emphasizes the preparation of students in production and management areas of the industry, including the selection, management, feeding and breeding of dairy cattle, and efficient, economical milk production.

Manufacturing

The Dairy Manufacturing Option emphasizes preparation for participation in the processing and distribution field, including sales, quality control, field work and dairy inspection.

CURRICULUM IN DAIRY SCIENCE

Freshman	F	W	S
Elements of Dairying (DH 121)	4		
Dairy Feeds and Feeding (DH 101)	2		
Feeding Dairy Cattle (DH 102)		2	
Market Milk (DM 133)			4
Freshman Composition (Eng 104, 105)	3	3	
Mathematics (Math 102, 103 or 113, 114)		3	3
General Zoology (Zoo 131)		4	
General Botany (Bot 121)	4		
Health Education (PE 107)			2
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives and courses to complete major	4	4	7
	<hr/> 17½	<hr/> 16½	<hr/> 16½

Dairy Science

Sophomore	F	W	S
Milk Production (DH 221)	4		
Dairy Products Judging (DM 233)			2
Economics (Ec 201 or 211)		3	
Public Speaking (Sp 201)			2
* Literature or philosophy	3	3	
* Humanities elective			3
General Bacteriology (Bact 221)	4		
General Psychology (Psy 202)			3
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives and courses to complete major	6	10	6
	17½	16½	16½
Junior			
Dairy Inspection (DM 332)			2
Dairy Product Merchandising (DM 303)		2	
General Inorganic Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226)			4
Report Writing (Eng 218)			3
American Government (Pol Sc 201)	3		
Electives and courses to complete major	10	10	7
	17	16	16
Senior			
Senior Project (DH 461, 462)	2	2	
Undergraduate Seminar (DH 463)			2
Biochemistry (Chem 328)	4		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)		3	
† Management elective		3	
Electives and courses to complete major	10	8	11
	16	16	16

HUSBANDRY OPTION (ADD COURSES BELOW TO BASIC CURRICULUM)

Freshman	Junior
DH 142 Dairy Cattle Judging..... (2)	DH 301 Advanced Dairy Cattle
SS 121 Soils	Feeding
	DH 323 History of Dairy Breeds
	and Pedigrees
	Bio 303 Genetics
	FM 321 Farm Records
	Senior
	DH 422 Breed and Selection of
	Dairy Cattle
	ASci 402 Animal Nutrition
	FM 322 Farm Management

MANUFACTURING OPTION (ADD COURSES BELOW TO BASIC CURRICULUM)

Freshman	Junior
DM 132 Ice Cream Making..... (4)	DM 331 Condensed and Dry Milk (4)
	FM 304 Agricultural Marketing (3)
	Mgt 311 Industrial Management..... (3)
	Senior
	DM 431 Dairy Plant Management (4)
	Actg 221 Principles of Accounting (4)
	Actg 222 Principles of Accounting (4)

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Dairy Husbandry, Dairy Manufacturing and other subjects.

* To be selected in accordance with the General Education requirement.

† To be selected from 300-400 series courses in ABM, AM or FM.

FOOD INDUSTRIES DEPARTMENT

Department Head, F. Raymond Steele

Earl J. Cosma

Thomas M. Lukes

Bruce E. Madden

Thomas O. Meyer

The Food Industries curriculum is designed to prepare students for employment in the various phases of the food industry. Instruction qualifies students for careers in production, quality control, food technology, marketing, and management.

The curriculum provides applied knowledge of the industry that will enable the graduate to accomplish doing and management jobs connected with operations of the industry from field to market. Skills acquired in the operations aspects of the industry are coordinated with studies in science, business, and humanities.

The departmental laboratories include complete facilities for small scale commercial production of canned, frozen, dehydrated and concentrated fruit and vegetable products. Meats laboratories provide for complete processing of meat including slaughtering, cutting, curing, smoking and sausage manufacture.

A six quarter two-year certificate program in food industries is scheduled in the winter and spring quarters over a three-year period so students who elect this program may work for six months each year in the industry during the major production season.

CURRICULAR OPTIONS

Management

The Management Option emphasizes preparation for participation in production and management aspects of the industry.

Meats

The Meats Option provides experience in meat packing and processing operations correlated with related science and business aspects of the industry.

CURRICULUM IN FOOD INDUSTRIES

Freshman	F	W	S
Survey of Food Industry (FI 101).....	2		
Food Processing Machinery (FI 122).....		3	
Elements of Food Preservation (FI 123).....			3
Freshman Composition (Eng 104, 105).....	3	3	
Introduction to Literature (Eng 207).....			3
* Mathematics.....	3	3	
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Health Education (PE 107).....			2
Electives and courses to complete major.....	7	7	7
	<u>15½</u>	<u>16½</u>	<u>15½</u>

* Minimum of 6 units including Math 114 or 210.

Food Industries

Sophomore	F	W	S
Food Processing Operations (FI 221, 222, 223).....	3	3	3
Processed Food Inspection (FI 233).....			3
Physics (Phys 104 or 121).....	4		
General Bacteriology (Bact 221).....		4	
General Inorganic Chemistry (Chem 121, 122).....	4	4	
Organic Chemistry (Chem 226).....			4
Public Speaking (Sp 201).....	2		
Physical Education Activity (PE 241).....	½	½	½
Electives and courses to complete major.....	3	6	6
	16½	17½	16½

Junior			
Food Plant Quality Control (FI 321).....	3		
Statistical Quality Control (FI 332).....		3	
Packaging (FI 336).....			4
Sanitation and Waste Disposal (FI 331).....	3		
Food Microbiology (Bact 421).....	4		
Biochemistry (Chem 328).....	4		
Economics (Ec 201 or 211).....			3
American Government (Pol Sc 201).....		3	
General Psychology (Psy 202).....		3	
Growth of American Democracy (Hist 204).....			3
Electives and courses to complete major.....	3	7	7
	17	16	17

Senior			
Senior Project (FI 461, 462).....	2	2	
Undergraduate Seminar (FI 463).....			2
U.S. in World Affairs (Hist 205).....	3		
* Literature or Philosophy.....	3		3
Electives and courses to complete major.....	9	15	11
	17	17	16

MANAGEMENT OPTION (ADD COURSES BELOW TO BASIC CURRICULUM)

Freshman		Junior	
Plant science or botany.....	(8)	IR 214 Industrial Relations.....	(3)
DM 230 General Dairy Manu- facturing.....	(4)	Bus 301 Business Law Survey.....	(3)
		AM 250 Computer Application.....	(2)
Sophomore		Senior	
Actg 131-2 Basic Accounting.....	(6)	FI 421-2 Advanced Food Proc- essing.....	(6)
Mgt 201 Principles of Manage- ment.....	(3)	FI 433 Food Production Control.....	(4)

* To be selected in accordance with the General Education requirement.

Food Industries

MEATS OPTION (ADD COURSES BELOW TO BASIC CURRICULUM)

Freshman		Junior	
Animal Science	(8)	FI 338 Sausage, Smoked and	
FI 210 Meats	(3)	Canned Meats	(3)
		Mgt 311 Industrial Management ..	(3)
		VS 123 Anatomy & Physiology	(3)
Sophomore		Senior	
Zoo 131 General Zoology	(4)	FI 431 Meat Technology	(4)
FI 212 Meat Classification and		IR 214 Industrial Relations	(3)
Grading	(2)	FI 433 Food Production Control ..	(4)

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Food Industries and other subjects.



NATURAL RESOURCES MANAGEMENT DEPARTMENT

Acting Department Head, Marvin J. Whalls

R. J. Greffenius

William B. Kurtz

Natural resources are vital to the well-being of the nation. Increasing utilization of natural resources for economic uses and outdoor recreation is reflected in a growing demand for graduates prepared to assume positions of major responsibility. The Natural Resources Management Department prepares students for careers in the management and protection of our natural resources: water, forage, forests, fish and wildlife, wildlands, and recreational lands.

The basic curriculum in natural resources management provides courses in the foundation disciplines of agriculture, humanities, mathematics, and the natural, physical and social sciences. In addition to the basic curriculum, each student of natural resources management is required to complete a block of courses in a field of specialization. Opportunities are available to specialize in conservation education, environmental communications, fisheries and wildlife management, forest resources management, parks and outdoor recreation, or resource law enforcement. Students are awarded the degree of Bachelor of Science upon completion of the program.

Graduates enter employment with federal agencies such as Forest Service, Park Service, and Bureau of Land Management; state agencies such as Natural Resources, Parks and Recreation, and Fish and Game; local agencies such as Park Authorities, Regional Forests and County Parks; and private industry such as lumber companies, utility companies, hunting preserves, and rural recreational enterprises.

The departmental facilities provide opportunity for development of skills necessary for natural resources management and field exercises utilize special campus sites and nearby public and private resource areas.

CURRICULUM IN NATURAL RESOURCES MANAGEMENT

Freshman	F	W	S
Introduction to Natural Resources Management (NRM 112)	3		
Soils (SS 121)			4
Introductory Physics (Phys 104)	4		
*Mathematics	3	3	3
General Inorganic Chemistry (Chem 121)		4	
General Botany (Bot 121, 123)		4	4
Freshman Composition (Eng 104, 105)	3	3	
History of California (Hist 112)			3
Health Education (PE 107)	2		
Safety and First Aid (PE 221)			2
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
**Electives		2	
	15½	16½	16½
Sophomore	F	W	S
Recreation Systems and Management (NRM 101)	3		
Resource Planning (NRM 206)		3	
Resource Survey (NRM 223)			3
Agricultural Surveying (AE 131)	2		
Elementary Probability and Statistics (Stat 211)			3
Geology (Geol 201)		3	
General Zoology (Zoo 131, 132)	4	4	
Report Writing (Eng 218)	3		
Introduction to Literature (Eng 207 or 208)	3		
Public Speaking (Sp 201)			2
General Psychology (Psy 202)			3
Cultural Anthropology (Ant 201)			3
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
**Electives	2	7	2
	17½	17½	16½

* A minimum of 9 units from mathematics, statistics and probability, or computer science must be chosen with approval of the adviser.

** 16 elective units must be chosen with adviser's approval.

Natural Resources

	F	W	S
Junior			
Resource Law Enforcement (NRM 312).....		2	
Natural Resources Policy (NRM 302).....	3		
Ecology of Resource Areas (NRM 323).....			3
Photogrammetry (AE 145).....	3		
General Ecology (Bio 325).....			3
Soil Conservation (SS 202).....	3		
Economics (Ec 211).....	3		
Introduction to Philosophy (Phil 201).....			3
American Government (Pol Sc 201).....		3	
Growth of American Democracy (Hist 204).....		3	
The United States in World Affairs (Hist 205).....			3
**Electives	4	7	5
	<hr/> 16	<hr/> 15	<hr/> 17
Senior	F	W	S
Senior Project (NRM 461, 462).....	2	2	
Undergraduate Seminar (NRM 463).....			2
Recreational Resource Management (NRM 438).....		4	
Business Law Survey (Bus 301).....	3		
Multiple Use Water Management (AE 328).....		4	
Humanities elective (Lit, Phil, Art, Dr or Mu).....	3		
Political and Economic Geography (Geog 315).....	3		
Business and Human Relations (IR 415).....			3
**Electives	6	6	12
	<hr/> 17	<hr/> 16	<hr/> 17

See COURSES OF INSTRUCTION section of this catalog for description of courses in Natural Resources Management and other subjects.

** 16 elective units must be chosen with adviser's approval.

ORNAMENTAL HORTICULTURE DEPARTMENT

Department Head, Howard C. Brown

Anthony J. Amato

James A. D'Albro

E. Wesley Conner

Thomas E. Eltzroth

Timothy A. Gaskin

Robert L. Gordon

Ernest R. Houston

The ornamental horticulture curriculum offers the student a comprehensive preparation for attractive positions in the nursery, greenhouse, landscape, and florist industries. This includes both the production and sales-service areas of these major fields. The training stresses production and marketing of nursery plants, cut flowers, pot plants, and tropical foliage plants, landscape design, planting and supervision, and floral design and marketing.

Graduates of the Ornamental Horticulture Department qualify for management positions in nursery, greenhouse, and florist establishments, as well as supervisory positions in parks and grounds. Many of the graduates enter the field of teaching. Some of the most popular areas of employment include plant propagation, nursery sales, cut flower and pot plant production, greenhouse management, landscape design, landscape contracting and maintenance, the field of advising for fertilizer and pesticide companies, and floral design and floral shop management.

The facilities of the department include a student-operated commercial greenhouse range and nursery in which students carry on a project program involving wholesale and retail sales; and a student-operated florist shop in which the students design and sell floral pieces. Also included are 18,000 square feet of glass-houses, 2,500 square feet of lathhouses, coldframes, seedbeds, and an extensive field-growing and container-growing area. Large, modern, well-equipped laboratories adjoin the greenhouse range. Over 200 acres of landscaped campus area serve as an outdoor laboratory. The campus is planted with many interesting and unusual trees and shrubs from all over the world, as well as a large number of native plant materials.

Also available are the latest models of equipment necessary in nurseries, greenhouses, parks and grounds, landscaping, and florist shops. An extensive list of periodicals covering the field of ornamental horticulture is available to students. Through the staff, affiliation in several national and state horticultural organizations is maintained.

Students interested in the two-year technical certificate should refer to the introductory statement for the School of Agriculture which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN ORNAMENTAL HORTICULTURE

Freshman	F	W	S
Nursery Practice (OH 121).....	4		
Plant Materials I (OH 122).....		4	
Floriculture (OH 123).....			4
Landscape Drafting (OH 124).....	2		
Orientation to Ornamental Horticulture (OH 100).....	1		
Plant Materials II (OH 126).....			4
Agricultural Mechanics (AE 121, 122).....	2		2
Freshman Composition (Eng 104, 105, 106).....	3	3	3
Mathematics (Math 102, 103 or 113, 114).....		3	3
Health Education (PE 107).....		2	
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
General Botany (Bot 121, 123).....	4	4	
	16½	16½	16½

Ornamental Horticulture

Sophomore	F	W	S
Plant Materials III (OH 221)	4		
Principles of Landscape Design (OH 223)		4	
Plant Propagation (OH 233)			4
General Entomology (Ent 126)			4
Soils (SS 121)	4		
Agricultural Surveying (AE 131)		2	
Agricultural Tractors and Equipment Skills (AE 141)			2
Public Speaking (Sp 201)		2	
Economics (Ec 201 or 211)			3
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
General Psychology (Psy 202)	3		
Plant Pathology (Bot 323)	4		
General Bacteriology (Bact 221)		4	
* Electives	1	4	3
	16 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$
Junior			
Fertilizers (SS 221)		4	
Basic Accounting (Actg 131, 132)		3	3
American Government (Pol Sc 201)	3		
General Inorganic Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226)			4
Genetics (Bio 303)	3		
Business Law Survey (Bus 301)			3
* Electives	7	6	6
	17	17	16
Senior			
Diseases and Pests (OH 327)	4		
Native Plant Materials (Bot 238)			3
Arboriculture (OH 421)	4		
Senior Project (OH 461, 462)	2	2	
Undergraduate Seminar (OH 463)			2
§ Plant Breeding (CrSc 304)	4		
Biochemistry (Chem 328)		4	
** Management elective			3
§§ Literature, Philosophy	3	3	
§§ Humanities elective			3
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
Fruit Crops (FrSc 230 or 332)		4	
Electives			2
	17	16	16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Ornamental Horticulture and other subjects.

* At least 12 units to be selected with the approval of the adviser.

** To be selected from any 300-400 series courses in ABM, AM or FM.

§ Plant physiology (Bot 322) may substitute for this requirement.

§§ To be selected in accordance with the General Education requirement.

POULTRY INDUSTRY DEPARTMENT

Roland K. Pautz

Leo Sankoff

The poultry industry is an important part of agriculture and food production in California. This industry offers an increasing demand for young men trained in modern techniques of the industry. The function of this department is to prepare students for various major fields of commercial poultry production and the many allied services of the industry. Opportunities in the allied industry services are many as shown by the fact that graduates have worked in more than fifty kinds of jobs within the industry.

The college plant has facilities for more than 15,000 birds in the 12-acre poultry plant which maintains a commercially productive unit with six breeds of chickens, in addition to the turkey flock. The plant includes a modern 15,000 egg hatchery, poultry-dressing plant, and egg-handling facilities as well as most of the types of poultry-raising equipment commonly used in California.

Each poultry major has an opportunity to conduct commercially productive projects in market eggs, hatching eggs or meat birds which gives him additional experiences in the field of his major interest and practice in many business transactions. Advanced students may have opportunities to conduct technical management or developmental problems.

Students interested in the two-year technical certificate should refer to the introductory statement for the School of Agriculture which describes this program. Detailed curriculum information is available from the department head.

CURRICULUM IN POULTRY INDUSTRY

Freshman	F	W	S
Poultry Industry Development (PI 121)	4		
Replacement Programs & Broiler Production (PI 122)		4	
Poultry Feeding & Nutrition (PI 123)			4
Agricultural Mechanics (AE 121, 122)		2	2
Freshman Composition (Eng 104, 105, 106)	3	3	3
Mathematics (Math 102, 103 or 113, 114)	3	3	
Health Education (PE 107)			2
Physical Education Activity (PE 141)	½	½	½
General Zoology (Zoo 131, 132)	4	4	
General Botany (Bot 121)			4
Electives	2		2
	16½	16½	17½
Sophomore			
Poultry Selection and Egg Production (PI 221)	2		
Poultry Production Processing & Marketing (PI 222)		3	
Poultry Incubation (PI 223)			2
Poultry Plant Design & Equipment (PI 233)			2
Agricultural Engineering or Welding	2		
Poultry Anatomy and Physiology (PI 231)	3		
Soils (SS 121)			4
Public Speaking (Sp 201)		2	
Economics (Ec 201 or 211)	3		
** Humanities elective		3	
Physical Education Activity (PE 241)	½	½	½
General Bacteriology (Bact 221)	4		
Genetics (Bio 303)		3	
General Psychology (Psy 202)		3	
** Business Management			3
Electives	2	3	4
	16½	17½	15½

** To be selected in accordance with General Education requirement.

To be selected from Bus 301, FPM 310, IR 118, Mgt 311.

Poultry

Junior	F	W	S
Applied Poultry Breeding (PI 321)	3		
Hatchery Business Organization (PI 322)		4	
Poultry Hygiene and Flock Health (PI 303)			3
Agricultural Engineering			2
Farm Records (FM 321)	4		
Principles of Farm Management (FM 322)			4
** Literature, Philosophy	3	3	
American Government (Pol Sc 201)		3	
Growth of American Democracy (Hist 204)			3
General Inorganic Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226)			4
Electives	2	3	
	<hr/> 16	<hr/> 17	<hr/> 16
Senior			
Advanced Poultry Enterprise Supervision (PI 402)		3	
Turkey Industry (PI 421)	3		
Senior Project (PI 461, 462)	2	2	
Undergraduate Seminar (PI 463)			2
Animal Nutrition (ASci 402)			4
†† Management Elective		3	
U.S. in World Affairs (Hist 205)			3
Biochemistry (Chem 328)		4	
Electives	11	5	7
	<hr/> 16	<hr/> 17	<hr/> 16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Poultry Industry and other subjects.

** To be selected in accordance with General Education requirement.

†† To be selected from any 300-400 series course in ABM, AM or FM.



SOIL SCIENCE DEPARTMENT

Department Head, Curtis Dean Piper

Arnold M. Dean
Bruce A. Dickson

Royce L. Lambert
Raymond V. Leighty

The curriculum of the Soil Science Department prepares graduates for employment in professional positions encompassing the various fields of agriculture, such as soil conservationists, land appraisers, fertilizer distributors, farm advisers, farm managers, farm operators or agriculture teachers, and highly specialized positions such as those of soil surveyors, laboratory technicians, college instructors, and soil specialists.

Facilities of the department have been developed to provide laboratory and glass-house space and equipment to emphasize the utilization of classroom knowledge in a practical work situation. The use of demonstration plots and the application of accepted cultural practices on the college farm are among the methods utilized to bridge the gap between the classroom and working experiences.

Students who elect to major in soil science have the opportunity to study in the foundation disciplines of agriculture, humanities and science. The students who select courses in soil science as electives will obtain an essential understanding of the important relationship between man and the soil in regard to meeting the demands for a higher productive capacity for food and fiber.

Students interested in the two-year technical certificate should refer to the introductory statement of the School of Agriculture and Natural Resources which describes the program. Detailed curriculum information is available from the department head.

CURRICULUM IN SOIL SCIENCE

Freshman	F	W	S
Soils (SS 121)	4		
Soil Management (SS 122)		4	
Soil Materials (SS 123)			3
Crop Production (CrSc 123 or 132 or 133 or VgSc 230)	4		
Animal Production (ASci 230 or DH 230 or PI 230)			4
Agricultural Mechanics (AE 121 or 122 or 141)		2	
Recreation Systems and Management (NRM 101)			3
Freshman Composition (Eng 104, 105)	3	3	
§ Mathematics		3	3
General Botany (Bot 121, 122)	4	4	
Health Education (PE 107)			2
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	15½	16½	15½
Sophomore	F	W	S
Soil Conservation (SS 202)		3	
Fertilizers (SS 221)	4		
Fruit Production (FrSc 131 or 132 or 230 or 332)	4		
Nursery Practices (OH 230 or 121)			3
Agricultural Surveying (AE 131)			2
Elementary Probability and Statistics (Stat 211)		3	
§ Mathematics	3		
General Inorganic Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226)		4	
Economics (Ec 201 or 211)	3		
American Government (Pol Sc 201)		3	
Growth of American Democracy (Hist 204)			3
Forest Resources (NRM 102)			3
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Approved conservation course			3
Electives			2
	18½	17½	16½

§ A minimum of 9 units shall be chosen with the approval of the adviser from 100 or 200 series courses in mathematics.

Soil Science

Junior	F	W	S
Soil Classification (SS 321)	4		
Soil Fertility (SS 322)		3	
Land Use Planning (SS 433)			3
Farm Records (FM 321) or Basic Accounting (Actg 131)	3		
Farm Management (FM 322)			4
Biochemistry (Chem 328)	4		
General Bacteriology (Bact 221)		4	
General Entomology (Ent 126) or Insect Control (CrSc 311)			4
U.S. in World Affairs (Hist 205)		3	
Public Speaking (Sp 201)		2	
Introduction to Literature (Eng 207 or 208)		3	
Introductory Physics (Phys 104)	4		
Approved Science or Mathematics			3
Electives	2	2	2
	<hr/> 17	<hr/> 17	<hr/> 16
Senior			
Soil Microbiology (SS 422)		3	
Soil Chemistry (SS 423)			3
Soil Physics (SS 432)	4		
Senior Project (SS 461, 462)	2	2	
Undergraduate Seminar (SS 463)			2
** Approved Social Sciences course		3	
Introduction to Philosophy (Phil 201)			3
Plant Physiology or Pathology (Bot 322 or 323)		4	
** Humanities elective	3		
† Management Elective	3		
Electives	4	5	7
	<hr/> 16	<hr/> 17	<hr/> 15

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Soil Science and other subjects.

VETERINARY SCIENCE DEPARTMENT

Department Head, Wallace F. Glidden
Merton D. Feters

Veterinary science courses are offered to supplement the major work provided in the animal science departments of the School of Agriculture. Keeping the college herds and flocks healthy provides the student with valuable laboratory opportunities in basic veterinary hygiene. Veterinary science courses are open as elective courses to students who have the proper prerequisites.

The department also supplies meat inspection service for the meats laboratory.

** To be selected in accordance with the General Education requirement.

† To be selected from any 300-400 series course in ABM, AM, FM, or Bus. Adm.

§ A minimum of 9 units shall be chosen with the approval of the adviser from 100 or 200 series courses in mathematics.

SCHOOL OF ARCHITECTURE AND ENVIRONMENTAL DESIGN



SCHOOL OF ARCHITECTURE AND ENVIRONMENTAL DESIGN

George J. Hasslein, FAIA, Dean

Directors

William H. Brown
Paul R. Neel

William R. Phillips
Kenneth E. Schwartz

Michio Ando
Robert F. Asbury, Jr.
James R. Bagnall
George M. Baumgarten
Robert O. Beauchamp
David A. Brodie
B. Joseph Crescione
Albert W. Draves
John W. Edmisten
J. Handel Evans
Donald P. Grant
R. L. Graves, Jr.
Joseph I. Greenberg
Kenneth L. Haggard

Anatol Helman
Francis H. Hendricks
Carl C. F. Hsieh
George K. Ikenoyama
Thomas V. Johnston
Donald J. Koberg
Joseph M. Kourokis
Jan Lubicz-nycz
Hans L. Mager
Willard L. McGonagill
Ronald R. Morgan
Dell O. Nickell
Raymond E. Nordquist
Ameen I. Noshay

C. James Olsten
Benjamin K. Polk
Charles W. Quinlan
Robert G. Reynolds
Satwant S. Rihal
David R. Saveker
Helmut L. Schleicher
John S. Stuart
S. Ernest Swickard
Edward J. Ward
Wesley S. Ward
Maurice L. Wilks
Robert E. Williams
Carleton M. Winslow

The School of Architecture offers four interacting degree programs: Architecture, Architectural Engineering, City and Regional Planning, and Construction Engineering. The student is kept aware that these programs have a common objective and that they are all aimed at the betterment of man's physical environment. These programs endeavor to give the student a set of social values, a technical background, and a training which releases his creative faculties in a way which will make him effective in his profession and as a person.

The first two years of all four programs contain much common material and develop basic skills and background. A decision as to which program the student will pursue need not be made until the beginning of the junior year providing the basic curriculum for the first two years is followed without the substitutions indicated. The College is residential in nature with an interest in and concern for the student's total time and being.

The excellent School facilities include design laboratories, dark rooms, soils laboratory, stress laboratory, shops, construction yard, project yard and grading galleries. An outlying area of 12 acres known as the "Canyon" is available for extensive experimental construction. The location of the College between the great population centers of San Francisco and Los Angeles is ideal for an architectural school in that it permits concentration and provides for environmental studies ranging from rural to large metropolitan complexes. There is a continual stream of visiting instructors. Field trips are arranged to various parts of the State as required work.

The School is a Member of the Association of Collegiate Schools of Architecture and maintains a Student Chapter of the American Institute of Architects and Scarab, the professional architectural fraternity.

All student work submitted for course credit becomes School property and will be returned only at the discretion of the instructor.

Recommended Preparation

The prospective transfer student should prepare himself by taking equivalent Mathematics, Physics and other General Education courses. Wherever possible, he should endeavor to include in his preparation as much as possible of the following 24 semester units of introductory architectural courses: Perspective 2, Freehand Drawing 1, Architectural Delineation 3, Architectural Design 10, Materials of Construction 2, Architectural Drafting 6.

BASIC CURRICULUM

The first two years of the Architecture, Architectural Engineering, City and Regional Planning and Construction Engineering curriculums have been designed to introduce the student to material which is basic to all these disciplines.

The student who is undecided as to his degree objective should follow the basic two-year program without the substitutions indicated and may thereby delay his degree decision until the end of the sophomore year. The student who is certain of his degree objective or who makes his decision during his freshman or sophomore year may take advantage of the substitutions noted.

Freshman	F	W	S
Descriptive Drawing (Arch 140)	1		
Introduction to Drawing and Perspective (Arch 144)	3		
⁴ Materials of Construction (Arch 106)			3
Delineation (Arch 145, 146)		2	2
Introduction to Design (Arch 111, 132, 143)	2	2	2
¹ Analytic Geometry and Calculus (Math 141, 142, 143)	4	4	4
² General Physics (Phys 131, 132)		4	4
Engineering Surveying (AE 237)		2	
Freshman Composition (Eng 104, 105)	3	3	
Public Speaking (Sp 201)			2
General Psychology (Psy 202)	3		
Health Education (PE 107)	2		
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	18½	17½	17½
Sophomore			
Basic Design (Arch 251, 252, 253)	3	3	3
³ Introduction to Urban Environment (CRP 211, 212, 243)	3	3	2
⁴ Architectural Practice (Arch 231, 232, 233)	3	3	3
⁴ Strength of Materials (Arch 205, 206)		3	3
Engineering Problems—Digital Computers (Arch 250)	2		
² General Physics (Phys 133)	4		
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
Philosophy		3	
Survey of Economics (Ec 201)			3
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	18½	18½	17½

CURRICULUM IN ARCHITECTURE

The educational preparation for the professional practice of architecture is of five year duration culminating in the Bachelor of Architecture degree. This program is accredited by the National Architectural Accrediting Board. Preparation for architecture spans several disciplines and requires a range of aptitudes. Not only must the architect be technically able and have a good aesthetic sense, but he must understand people and be sensitive to their needs. The program in architecture is broad in nature; however with a selection of elective work, areas of specialization can be included in the planning or engineering fields.

¹ City and Regional Planning majors may substitute Math 200, 204, 210, Stat 211.

² City and Regional Planning majors may substitute Phys 121, 122, 123, or Bio 101, 127, 128, Geol 201.

³ Architectural Engineering and Construction Engineering majors may substitute an elective for CRP 243.

⁴ City and Regional Planning majors may substitute 17 units of courses with School approval and 1 unit free elective.

Architecture

Junior	F	W	S
Architectural Design (Arch 351, 352, 353)	4	4	4
Architectural Practice (Arch 341, 342, 343)	2	2	2
Stress Analysis (Arch 304)	3		
Steel and Timber Structures (Arch 305, 306)		3	3
Stress Analysis Laboratory (Arch 344)	1		
History of Architecture (Arch 317, 318, 319)	3	3	3
Electrical Systems Design (EE 324)	3		
Plumbing and Building Sanitation (ET 313)		3	
Heating and Air Conditioning (EnvE 306)			3
Business Law Survey (Bus 301)		3	
* Life Science			3
	16	18	18
Senior			
Architectural Design (Arch 451)	5	5	5
Professional Practice (Arch 441, 442, 443)	2	2	2
Concrete and Masonry Structures (Arch 404, 405, 406)	2	2	2
Undergraduate Seminar (Arch 463)			2
**Electives	6	6	6
	15	15	17
Fifth Year			
Architectural Design (Arch 551)	5	5	5
Design Project (Arch 571, 572, 573)	2	2	2
Principles of Engineering Economy (IE 403)	3		
*Literature		3	
*Humanities			3
**Electives	6	6	6
	16	16	16

CURRICULUM IN ARCHITECTURAL ENGINEERING

The four year program in Architectural Engineering leads to the Bachelor of Science degree and has its major emphasis in the structural engineering of buildings. The curriculum is creative in purpose with aptitudes in science and mathematics recommended. Students of architectural engineering are educated with architects in a way to give their work the same dedication. Graduates of this program will in general seek professional registration as civil and structural engineers.

Junior	F	W	S
Design Theory (Arch 314, 315, 316)	2	2	2
Architectural Practice (Arch 341, 342, 343)	2	2	2
Stress Analysis (Arch 304)	3		
Steel and Timber Structures (Arch 305, 306)		3	3
Stress Analysis Laboratory (Arch 344)			1
Analytic Geometry and Calculus (Math 241)	4		
Mathematics of Matrices (Math 204)		3	
Introduction to Numerical Methods (CSc 332)			3
General Chemistry (Chem 124)		4	
Electrical Systems Design (EE 324)	3		
Plumbing and Building Sanitation (ET 313)		3	
Heating and Air Conditioning (EnvE 306)			3
* Life Science			3
*Humanities	3		
	17	17	17

* To be selected in accordance with the General Education requirement.

** 10 units of electives must be approved by the School.

Architecture

Senior	F	W	S
Structural Design (Arch 444, 445, 446)	5	5	5
Design Theory (Arch 401, 402, 403)	2	2	2
General Engineering (Arch 414, 415, 416)	2	2	2
Soil Mechanics and Foundations (Arch 421, 422)	3	3	
Senior Project (Arch 461, 462)	2	2	
Undergraduate Seminar (Arch 463)			2
*Literature			3
Electives	3	3	3
	<u>17</u>	<u>17</u>	<u>17</u>

CURRICULUM IN CITY AND REGIONAL PLANNING

The four year curriculum leading to a Bachelor of Science degree in City and Regional Planning is directed to the professional field which guides and designs the communities wherein we live. Inasmuch as the education of the student of planning is associated with that of the architect and the engineer, the program has an additional emphasis on design of the physical environment as well as on the process of planning. Concern with the activities of people and their values is essential.

Junior	F	W	S
Planning Theory (CRP 301, 302, 303)	2	2	2
Planning Laboratory (CRP 351, 352, 353)	4	4	4
Design for Planners (Arch 347, 348, 349)	2	2	2
Business Law Survey (Bus 301)	3		
Political & Economic Geography (Geog 315)	3		
State and Local Government (Pol Sc 401)		3	
Introduction to Sociology (Soc 105)	3		
Social Problems (Soc 303)		3	
Report Writing (Eng 218)			3
*Literature		3	
*Life Sciences			3
	<u>17</u>	<u>17</u>	<u>14</u>
Senior			
Planning Theory (CRP 401, 402)	2	2	
Planning Laboratory (CRP 451, 452, 453)	4	4	4
Senior Project (CRP 461, 462)	2	2	
Undergraduate Seminar (CRP 463)			2
Design for Planners (Arch 447, 448, 449)	2	2	2
Urban Sociology (Soc 313)	3		
*Humanities			3
Electives	2	3	3
	<u>15</u>	<u>13</u>	<u>14</u>

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Architecture and Architectural Engineering, City and Regional Planning and other subjects.

* To be selected in accordance with the General Education requirement.

Architecture

CURRICULUM IN CONSTRUCTION ENGINEERING

The four year program in Construction Engineering leads to the Bachelor of Science Degree. Major emphasis is placed on engineering, organizing and managing the construction phase of man's efforts to improve his environment. The Construction Engineer is an important member of the building team and requires a professional knowledge of techniques, materials, equipment, job planning and cost control to add to the contributions of the planning and design professions. Graduates of this program can help supply the urgent needs of the construction industry and its related fields.

	F	W	S
Junior			
Construction Practice (ConE 341, 342, 343).....	2	2	2
Stress Analysis (Arch 304).....	3		
Steel and Timber Structures (Arch 305, 306).....		3	3
Stress Lab (Arch 344)		1	
Mathematics of Matrices (Math 204).....	3		
Mathematics of Statistics (Math 321, 322)		3	3
General Chemistry (Chem 124).....		4	
Physical Geology (Geol 201).....			3
Electrical Systems Design (EE 324).....	3		
Plumbing & Building Sanitation (ET 313).....		3	
Heating & Air Conditioning (EnvE 306).....			3
Principles of Management (Mgt 201).....	3		
Business Law Survey (Bus 301).....	3		
*Life Science			3
	<hr/> 17	<hr/> 16	<hr/> 17
Senior			
Construction Practice (ConE 441, 442, 443).....	2	2	2
Construction Engineering Laboratory (ConE 451, 452, 453).....	5	5	5
Senior Project (ConE 461, 462).....	2	2	
Undergraduate Seminar (Arch 463).....			2
Concrete & Masonry Structures (Arch 404, 405, 406).....	2	2	2
Survey of Foundation Engineering (Arch 409).....	3		
Principles of Engineering Economy (IE 403).....		3	
*Humanities	3		
*Literature			3
Electives		3	4
	<hr/> 17	<hr/> 17	<hr/> 18

* To be selected in accordance with the General Education requirement.

SCHOOL OF BUSINESS AND SOCIAL SCIENCES



SCHOOL OF BUSINESS AND SOCIAL SCIENCES

Edward H. Barker, Dean

The School of Business and Social Sciences has two primary objectives: Education in the specific fields of Business Administration, Economics, and Social Sciences, and service to all schools of the College. This School, in providing that service, offers courses satisfying general education requirements that support major degree work throughout the college.

The School is organized in three departments and its broad objectives are in concert with the stated objectives of the college, which are to prepare students to meet the requirements of specific occupations and to help the individual to achieve maximum personal development. Specialized instruction in the school also prepares the student for citizenship, leadership, and constructive community living. Faculty members within this school are selected on the basis of academic qualifications and professional experience coupled with outstanding teaching ability.

Guiding all who work within the framework of this School is the ultimate objective of placing our graduates in responsible positions in both the private and public sector of our economy or in fields requiring further graduate education.

The following degrees are offered:

B.S.—Business Administration

B.S.—Social Sciences

M.B.A.—Master of Business Administration

Choices of occupational concentrations are available to support the undergraduate majors in diverse fields of study.

Students may also concentrate in Social Sciences as part of the requirements for a Master of Arts in Education.

BUSINESS ADMINISTRATION DEPARTMENT

Department Head, Owen L. Servatius

Roy E. Anderson
Lawrence E. Baur
William M. Boyce
Erling A. Breckan
Wallace H. Burt
Paul L. Dempsey
Charles A. Donohoe
Olaf F. Isachsen

John R. Jones
Paul Kenyon
Weston A. McCormac
Ernest C. Miller
Harold R. Miller
Eugene L. O'Connor
Howard R. O'Daniels

Philip H. Overmeyer
Gordon J. Paul
Rol W. Rider, Jr.
J. Weldon Rohner
Roger L. Sherman
Robert P. Vartan
Victor F. Wolcott

The Department offers an undergraduate program leading to the Bachelor of Science Degree in Business Administration with several concentrations available. A graduate program leading to a Master of Business Administration degree is offered to students from diverse undergraduate disciplines.

The undergraduate program prepares students for employment in the administrative and technical functions of business, labor unions, and governmental agencies. It combines courses in general education and a core of business subjects with a concentration in a specialized field in business. Opportunities for students are enhanced by the availability of elective courses in the Schools of Agriculture, Architecture, Engineering and Technology, Applied Arts, and Applied Sciences. Thus, the program provides both a broad and specialized educational experience.

The objective of the graduate program is to provide a comprehensive and flexible program of study for graduates from diversified academic backgrounds which will lay the professional foundation for careers of growing responsibility in the business community and related fields. The program encompasses a broad integrated approach to problem solving and decision making with opportunity for functional specialization. Requirements for the degree include completion of foundation courses prior to entry into the three-quarter integrated program of graduate study. Accelerated graduate foundation courses provide a flexible basis for completing all but five required undergraduate foundation courses. Thus, the degree requirements can be completed in one calendar year if these five foundation courses are completed by the student as an undergraduate.

CURRICULAR CONCENTRATIONS

Accounting

The accounting concentration provides training and practice for both public and private accounting areas.

Economics

This concentration stresses economic analysis as it applies to business and governmental decision making. It is designed to afford the student an opportunity to explore economic theory and its application to the American economy and to prepare students for entry positions in business or government, or for graduate studies.

Finance and Property Management

This concentration is designed as a flexible program for the student wishing to pursue opportunities in the fields of finance, insurance and real estate.

Industrial Relations

The two areas of interest within this concentration relate to labor-management relations and personnel management.

Management

This concentration stresses the managerial process and decision making fundamental to all levels and functional areas of the business and industrial enterprise. The management program offers both quantitative and general management emphases to satisfy the individual needs of the student relative to business or academic ambitions.

Marketing

Marketing includes all the business activities involved in directing the flow of goods and services from the original producer through intermediate processors to the consumer. This concentration emphasizes the management of marketing activities within the firm in coordination with all other activities to accomplish the firm's objective.

CURRICULUM IN BUSINESS ADMINISTRATION

Freshman *	F	W	S
The Business Enterprise (Bus 101)	4		
Human Relations (IR 118)		3	
Freshman Composition (Eng 104, 105)	3	3	
Principles of Speech (Sp 200)			3
** Literature			3
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Health Education (PE 107)	2		
** Natural Sciences	4	7	4
Mathematics for General Education (Math 200)		3	
Finite Mathematics for Business (Math 210)			3
Electives	3		4
	<u>16½</u>	<u>16½</u>	<u>17½</u>

* Unless already acceptable typists, majors will be required to take Bus 141 during their freshman year.

** To be selected in accordance with the General Education requirement.

Business Administration

Sophomore	F	W	S
Principles of Economics (Ec 211, 212, 213).....	3	3	3
Principles of Accounting (Actg 221, 222).....	4	4	
Cost Accounting and Analysis (Actg 223).....			4
Industrial Relations (IR 214).....	3		
Marketing Principles (Mktg 204).....			4
Principles of Management (Mgt 201).....		3	
Physical Education Activity (PE 241).....	½	½	½
Introduction to Philosophy (Phil 201).....			3
Data Processing (CSc 100).....	2		
Business Data Processing (CSc 140).....		2	
Mathematics (Math 221 or Math 215).....	4		
Elementary Probability and Statistics (Stat 211).....		3	
Statistical Methods (Stat 212).....			3
Electives.....		2	
	16½	17½	17½
Junior			
Business Law (Bus 307, 308).....	4	4	
Money, Credit and Banking (Ec 337).....	3		
Financial Management (FPM 342, 343).....		3	3
General Psychology (Psy 202).....	3		
Political and Economic Geography (Geog 315).....			3
American Government (PolSc 201).....	3		
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 205).....			3
***Electives and courses to complete major.....	4	6	6
	17	16	15
Senior			
Business Policies (Mgt 413).....	3		
Business Organization (Mgt 414).....		3	
Business and Human Relations (IR 415).....			3
Senior Project (Bus 461, 462).....	2	2	
Undergraduate Seminar (Bus 463).....			2
** Literature, Philosophy, Art or Music.....		3	
Social Sciences elective.....	3		
***Electives and courses to complete major.....	7	9	11
	15	17	16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Accounting, Business, Business Administration, Finance and Property Management, Industrial Relations, Management, Marketing and other subjects.

** To be selected in accordance with the General Education requirement.

*** 27 of the elective units in the junior and senior years must be chosen with the approval of the adviser in a field of concentration.

CURRICULUM FOR THE MASTER OF BUSINESS ADMINISTRATION DEGREE

(For College requirements see the *Graduate Study Bulletin*)

I. Foundation Program: Complete the following undergraduate courses, their equivalent, *or* their counterpart graduate foundation courses.

A. Undergraduate foundation courses	B. Graduate foundation course counterpart
* Bus 301	None
* CSc 101	None
* Ec 211, 212	None
* Mktg 204	None
Actg 221, 222, 223	BA 510 Foundations in Accounting(4)
FPM 342, 343	BA 520 Foundations in Finance(2)
IR 214, 415; Mgt 201	BA 530 Foundations in Management(3)
Math 221, 200, 210	Math 540 Foundations for Quantitative Methods(4)
Stat 211, 212	Stat 540 Foundations in Statistics(3)

II. Integrated Program

A. Core requirements	Units
BA 501 Accounting for Planning & Control	3
BA 511 Micro-Economics	3
BA 512 Macro-Economics	3
BA 525 Business Finance	3
BA 584 Seminar in Human Resources Management	3
BA 508 Marketing Management I	3
BA 527 Quantitative Methods I	3
BA 513 Operations Management	3
BA 506 Business and Society	3
BA 581, 582, 583 Seminar in Applied Decision Making (4, 4, 4)	12
	<hr/>
	39
B. Electives: Nine units to be selected from the following courses:	
BA 500, 509, 518, 522, 528 and any adviser-approved 400 or 500 level course	9
	<hr/>
	48

* These courses would normally be taken as undergraduate electives or requirements prior to acceptance for graduate study.

ECONOMICS DEPARTMENT

Department Head, Fuad H. Tellew

John P. Adams, Jr.
Sara A. Behman
George M. Eastham

Dominic Perello
Walter E. Rice
Howard F. Smith

R. Elberton Smith
Daniel P. Williamson

The Economics Department has two broad purposes: it serves all schools of the College by offering courses which will help students to understand the overall functioning of the American economy; secondly, it offers an undergraduate program leading to the Bachelor of Science Degree in Economics.

The Economics degree program will prepare students for employment in business and government as economists, analysts and general managers. The teaching of economics in high school is another occupational field for the economist. Finally, the program will prepare students to undertake graduate study in economics.

CURRICULAR CONCENTRATIONS

Economic Theory and Application

This concentration, emphasizing economic theory and its uses in private and public sectors of our economy, allows interested students to build greater economic knowledge and skills for graduate education and for private and public careers, including teaching.

Industrial Economics

The Industrial Economics concentration, designed for those students who intend to seek an industrial application of the economics discipline, provides a balanced program of economic and business theory and application.

International Trade and Development

This concentration provides a core of trade and development theory, plus study in the ancillary fields of agriculture and anthropology and the application of these fields to particular geographic regions. It is designed for those students interested in working in the international area in the public or private sectors.

CURRICULUM IN ECONOMICS

Freshman	F	W	S
Freshman Composition (Eng 104, 105)	3	3	
Data Processing (CSc 100)	2		
Technical Calculus (Math 131, 132) or Analytic Geometry and Calculus (Math 141, 142)		4	4
Health Education (PE 107)	2		
Physical Education Activity (PE 141)	½	½	½
*Natural science	3	3	6
Introduction to Sociology (Soc 105)	3		
*Art, drama, music		3	
Introduction to Literature (Eng 207)			3
Electives	3	3	3
	16½	16½	16½
Sophomore			
Principles of Economics (Ec 211, 212, 213)	3	3	3
Basic Accounting (Actg 131, 132)	3	3	
*Natural science	3		
Physical Education Activity (PE 241)	½	½	½
Elementary Probability and Statistics (Stat 211)		3	
Statistical Methods (Stat 212)			3
Report or Technical Writing (Eng 218 or 219)			3
Logic (Phil 202)	3		
Cultural Anthropology (Ant 201)		3	
General Psychology (Psy 202)			3
Electives	4	4	4
	16½	16½	16½

* To be selected in accordance with the General Education requirement.

Economics

Junior	F	W	S
Intermediate Economic Analysis (Ec 311, 312, 313)	4	4	4
Business Law Survey (Bus 301)	3		
Political and Economic Geography (Geog 315)			3
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
American Economic History (Ec 324)			3
Money, Banking and Credit (Ec 337)	3		
*Elective outside major		3	
**Electives and courses to complete major	3	6	5
	16	16	18
Senior			
Cost-Benefit Analysis (Ec 410)	3		
Monetary and Fiscal Policies (Ec 414)	4		
Development of Economic Analysis (Ec 317)		3	
Economics (Ec 304 or 325 or 401)			3
Senior Project (Ec 461)	3		
Undergraduate Seminar (Ec 463)			3
**Electives and courses to complete major	6	13	11
	16	16	17

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Economics and other subjects.

* To be selected in accordance with the General Education requirement.

** 18 units to be selected in a field of concentration.



SOCIAL SCIENCES DEPARTMENT

Department Head, William M. Alexander

Malcolm J. Carr
George G. Clucas
A. Norman Cruikshanks
Walter M. Cunningham
Anne C. Fowler
David L. George

Reginald H. Gooden
David R. Harrow
Robert L. Hoover
Earl D. Huff
Carl E. Lutrin
John A. McKinstry

Thomas F. Nolan
Robert E. Norris
Michael J. O'Leary
Leo W. Pinard II
Allen K. Settle
Joseph N. Weatherby

The Social Sciences Department serves all of the schools of the College in providing general education for citizenship. In general, the department seeks to provide the student with a better understanding of the society in which he lives, to develop in the student those skills and attitudes which are prerequisites for effective citizenship, and to prepare and encourage the individual toward intelligent and responsible social action.

The occupational objectives of the department are to train students for those numerous entry jobs in civil service, business, industry, and social welfare which require a bachelor's degree with a major in the social sciences, and to train those who expect to teach the social studies in elementary or secondary schools.

Students with majors in fields other than the social sciences may select courses which will aid in qualifying them for a variety of civil service positions.

The department offers two degrees: a Bachelor of Arts in Political Science and a Bachelor of Science in Social Sciences. Each provides opportunity for concentration in any one of three areas.

The department also offers graduate courses which permit the student to qualify for a Master of Arts Degree in Education with a concentration in the field of social sciences.

CURRICULUM IN POLITICAL SCIENCE

Curricular Concentrations

Administration

This concentration is designed to prepare students for careers in administrative work in government and related agencies and to prepare students to enter graduate studies in the field of administration.

International Affairs

This concentration is designed to prepare students for careers in government and related agencies which deal in the many problems in international affairs and to prepare students to enter graduate studies in the field of international relations.

Teaching

This concentration is designed to prepare students for careers as elementary school teachers and for careers as social studies teachers in junior high schools and high schools.

Freshman	F	W	S
Freshman Composition (Eng 104, 105, 106).....	3	3	3
United States History (Hist 201, 202, 203).....	3	3	3
National and California Government (Pol Sc 101, 102).....	3	3	
Introduction to International Relations (Pol Sc 105).....			3
Physical Education Activity (PE 141).....	½	½	½
Health Education (PE 107).....	2		
Public Speaking (Sp 201, 202).....		2	2
Math sciences elective.....			3
*Electives and courses to complete major.....	4	4	1
	15½	15½	15½

* 27 of the elective units must be chosen in a field of concentration and a total of 30 of the elective units must be at the 300-400 level. Concentration lists available at the departmental office.

Social Sciences

Sophomore	F	W	S
Principles of Sociology (Soc 201, 202, 203).....	3	3	3
Principles of Economics (Ec 211, 212).....	3	3	
General Psychology (Psy 202).....			3
Comparative Government (Pol Sc 202).....	3		
Basic Political Analysis (Pol Sc 203).....		3	
U.S. in World Affairs (Hist 205).....			3
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
*Electives and courses to complete major.....	6	6	6
	15½	15½	15½
Junior			
American Political Process (Pol Sc 302).....	3		
Modern Political Thought (Pol Sc 306).....		3	
International Politics (Pol Sc 312).....			3
Public Administration (Pol Sc 314, 315, 316).....	3	3	3
Biological sciences electives.....	3	3	3
*Electives and courses to complete major.....	7	6	6
	16	15	15
Senior			
American Constitutional Law (Pol Sc 321).....	3		
State and Local Government (Pol Sc 401).....		3	
Senior Project (Pol Sc 461, 462).....	2	2	
Undergraduate Seminar (Pol Sc 463).....			2
Natural sciences elective.....	3		
Literature elective.....			3
Philosophy elective.....			3
Humanities elective.....	3		
Physical sciences elective.....		3	
*Electives and courses to complete major.....	5	8	7
	16	16	15

* 27 of the elective units must be chosen in a field of concentration and a total of 30 of the elective units must be at the 300-400 level. Concentration lists available at the departmental office.

Social Sciences

CURRICULUM IN SOCIAL SCIENCES

Curricular Concentrations

Social Sciences

With proper selection of electives, this concentration leads to preparation for elementary or secondary teaching on completion of the fifth year. It also provides the student with a broad background for entry positions in business.

Social Services

By providing instruction in the social services area, this concentration prepares students to enter such fields as social work, corrections, probation, or parole.

Government Service

With proper selection of electives, this concentration provides students with preparation for entry positions in government at the local, state, and national level such as management analyst, personnel specialist, budget specialist, and administrative specialist.

Freshman †	F	W	S
Freshman Composition (Eng 104, 105, 106)	3	3	3
Physical Education activity (PE 141)	½	½	½
Basic Mathematics for General Education (Math 100)			3
* Natural Science	3	3	3
History of Civilization (Hist 101, 102, 103)	3	3	3
National and California Government (Pol Sc 101, 102)	3	3	
Introduction to International Relations (Pol Sc 105)			3
Electives	4	4	2
	16½	16½	17½
Sophomore			
Introduction to Philosophy (Phil 201)			3
Principles of Sociology (Soc 201, 202, 203)	3	3	3
Public Speaking (Sp 201)	2		
Health Education (PE 107)		2	
Physical Education Activity (PE 241)	½	½	½
General Psychology (Psy 202)			3
† Natural Science	3	3	
History of the United States (Hist 201, 202, 203)	3	3	3
Electives	5	5	5
	16½	16½	17½
Junior			
Literature	3	3	3
Advanced Public Speaking (Sp 202)	2		
Cultural Anthropology (Ant 201)			3
Senior Project (Soc Sc 461)			2
U.S. in World Affairs (Hist 205)	3		
† Philosophy		3	
Principles of Economics (Ec 211, 212, 213)	3	3	3
** Electives and courses to complete the major	6	6	6
	17	15	17

* To be selected in accordance with the General Education requirement. Include one sequence course which meets for three quarters with a minimum of 9 units.

** From 18 to 28 of the elective units must be chosen with the approval of the adviser in a field of concentration.

† Typing proficiency is required for graduation. A student who does not type may use one unit of elective credit to take Bus 141 to satisfy the requirement.

‡ To be selected in accordance with the General Education requirement.

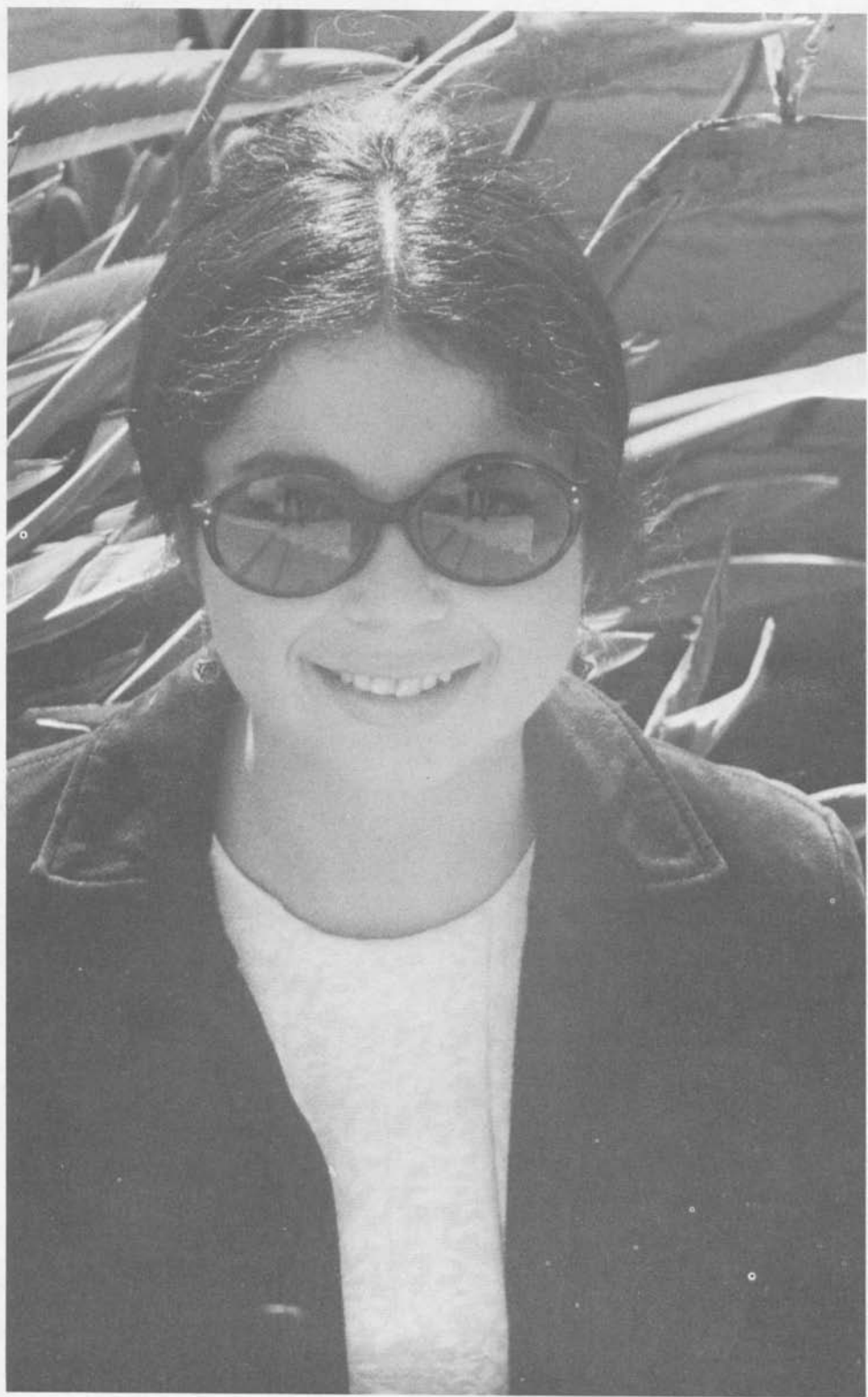
Senior

	F	W	S
Sociology (300 or 400 level).....	3		
Senior Project (Soc Sc 462).....	2		
Undergraduate Seminar (Soc Sc 463).....		2	
Political Science or History (Any 6 units from 300 or 400 level)		3	3
Geography (Geog 315)	3		
Comparative Economic Systems (Ec 304).....			3
Social Psychology (Psy 401).....		3	
** Electives and courses to complete the major.....	8	8	10
	<hr/> 16	<hr/> 16	<hr/> 16

See COURSES OF INSTRUCTION sections of this catalog for descriptions of courses in Anthropology, Archaeology, Geography, Political Science, Social Science, Sociology and other subjects.

** From 18 to 28 of the elective units must be chosen with the approval of the adviser in a field of concentration.





**SCHOOL OF COMMUNICATIVE ARTS
AND HUMANITIES**

SCHOOL OF COMMUNICATIVE ARTS AND HUMANITIES

Jon M. Ericson, Dean

The School of Communicative Arts and Humanities provides a wide range of course offerings.

Programs leading to the bachelor's degree are offered in English, Graphic Communications, History, Journalism, and Speech. The Master of Arts degree is offered in English.

Strong course offerings are outlined in the Art, Music, Philosophy, and Foreign Language and Linguistics Departments. Foreign language emphasis is in French and Spanish.

The School of Communicative Arts and Humanities offers courses related to and directly supporting curricula in agriculture and natural resources, architecture and environmental design, business and social sciences, engineering and technology, human development and education, and science and mathematics. Substantial co-curricular programs are found in Music, Drama, Speech and Forensics, Journalism, and Art.

ART DEPARTMENT

Department Head, Bernice B. Loughran

Roger S. Bailey
David B. Bodlak
Bernard W. Dusek

Charles W. Jennings
Erna B. Knapp
John B. Rea
Henry Wessels

The art instruction program is intended to prepare students for whatever diverse needs they might encounter in their work in the art field. As a part of the general education program, emphasis is placed on those criteria involved in the aesthetic experience: visual consciousness in seeing one's environment, personal expression, and the necessary control of manipulative processes to achieve the desired results. Since art and design are increasingly relevant to many occupational fields, art courses are frequently required within various majors.

Students enrolled in one of the many teacher education majors may elect a minor in art. The pattern for this program is described in the teacher credential bulletin. Those interested in this program should consult an art instructor and file a card in the Art Department office.

ENGLISH DEPARTMENT

Department Head, Willard M. Pederson

Elizabeth B. Anderson	Wilfred M. Green	Lachlan P. MacDonald
Stanley L. Barr	Robert J. Huot	John H. Mott, Sr.
Patricia A. Brenner	Starr Jenkins	Michael P. Orth
Marvin D. Brown	Mead R. Johnson	James J. Peterson
Edward A. Cairns	Miles B. Johnson	Eugene G. Prater
Gordon Curzon	David J. Kann	David R. Rollings
Max E. Darnielle	George W. Kastner	James E. Simmons
Harold D. Evans	John F. Kerr	Gerald J. Sullivan
Arthur H. Frieztzsche	Alfred Landwehr	William B. Wahl
David M. Grant	Martin L. Luschei	Isaac N. Walker
		Michael J. Wenzl

The English Department serves all schools of the college by providing courses which will increase a student's understanding, appreciation, and use of his language, in reading and composition. The department offers a variety of courses which, through close study of the works of acknowledged masters of language usage and through providing opportunities for the student himself to use language with greater accuracy and skill, contribute to the general education of majors in Agriculture, Engineering, Architecture, the Applied Arts and Applied Sciences.

The primary occupational objective of the department is the preparation of qualified teachers of English for elementary and secondary schools and for junior college. For this purpose the department offers a program leading to the B.A. degree for English teachers in the elementary and secondary schools, and a program leading to the M.A. degree for English instructors in the junior colleges. To produce teachers well versed in the areas of English commonly taught, the major curricula provide a balanced emphasis in study of the language and in the use of the language in composition and literature. A student majoring in English progresses through four significant steps in his education: first, a study of principles governing language, composition, and literature; second, a study of content illustrating these principles; third, application by the student of principles to content produced by himself and others; fourth, application of both principles and content to problems commonly met in the teaching situation.

For the purpose of assigning students to the appropriate level of training in language communication, a placement test is given. The test measures acceptable proficiency in language communication as revealed in sentence structure, appropriate usage, spelling, and paragraph units.

CURRICULUM IN ENGLISH

Freshman	F	W	S
Freshman Composition (Eng 104, 105, 106).....	3	3	3
Introduction to Fiction, Drama, Poetry (Eng 201, 202, 203)....	2	2	3
Principles of Speech (Sp 200)			3
Physical Education Activity (PE 141).....	½	½	½
Health Education (PE 107)	2		
Basic Mathematics for General Education (Math 100).....		3	
History of Civilization (Hist 101, 102, 103).....	3	3	3
*Natural Science.....	3	3	3
** Electives	2		1
	15½	14½	16½

* A minimum of 15 units of natural science is required for graduation. (See General Education Requirement). Include one sequence course which meets for three quarters with a minimum of 9 units.

** Satisfactory skill in typing is required for graduation. A student who does not type may satisfy the requirement by electing Bus 141.

English

Sophomore	F	W	S
European Literature (Eng 211)	3		
Advanced Composition (Eng 304, 305, 306)	3	3	3
American Literature (Eng 311, 312, 313)	3	3	3
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
Physical Education Activity (PE 241)	½	½	½
* Natural Science	3	3	
Cultural Anthropology (Ant 201)		3	
General Psychology (Psy 202)			3
** Social Sciences (except history)			3
Electives	1	1	1
	16½	16½	16½
Junior			
British Literature (Eng 307, 308, 309)	3	3	3
Modern English Grammar (Eng 301, 302)	3	3	
Introduction to Shakespeare (Eng 210)			3
Children's Literature (Eng 205) or Readings for Young Adults (Eng 316)		3	
Techniques of Oral Reading (Sp 305)		3	
Introduction to Philosophy (Phil 201)	3		
** Art, Music, or Drama			3
† Electives	6	3	6
	15	15	15
Senior			
Senior Project (Eng 461)	2		
History of the English Language (Eng 303)			3
Modern Novel (Eng 415) or Modern Poetry (Eng 416) or Elizabethan Drama (Eng 419)	3		
Significant Writers (Eng 414, 417, or 418)	3	3	3
† Electives	7	12	9
	15	15	15

CURRICULUM FOR THE MASTER OF ARTS DEGREE

(For College requirements see *Graduate Study Bulletin*)

	Units
Eng 502 Introduction to Critical Analysis	3
Eng 503 Contemporary Language Study	3
Eng 504 Problems in Language	3
Eng 505 Problems in Composition	3
Eng 511 Problems in American Literature	3
Eng 512 Problems in British Literature	3
Eng 590 Graduate Seminar in English	3
Additional units in the Eng 300, 400 and 500 series, selected with advisory committee approval. At least 3 units must be at 500 level	15
Elective units in other departments, selected with advisory committee approval	9
Total Units	45

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in English, Foreign Language and other subjects.

* A minimum of 15 units of natural science is required for graduation. (See General Education requirement.) Include one sequence course which meets for three quarters with a minimum of 9 units.

** To be selected in accordance with the General Education requirement.

† At least 7 of the elective units must be at the 300-400 level.

FOREIGN LANGUAGE AND LINGUISTICS DEPARTMENT

Robert O. Boothe
Vincent P. Farr
Gloria Jameson
Charles H. Lindamood

Robert G. Lint
Habib Sheik
Verlan H. Stahl

Instruction in foreign languages is offered to prepare the student for specific technical, vocational, literary, and cultural needs at home and overseas. Linguistic principles of language learning and language teaching focus on the understanding and use of the particular language.

English as a Second Language, Spanish, French, German (including Scientific German) are offered. The subject matter and teaching methods used provide a useable, practical knowledge of the language studied.

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in French, German, Language, and Spanish.



GRAPHIC COMMUNICATIONS DEPARTMENT

Department Head, Roderick W. Carruthers

James H. Babb
Peter R. Delvaglio
Wesley T. Dunn

Donald F. Reilly
James E. Rice

Guy H. Thomas, Jr.
Joseph W. Truex

The Graphic Communications Department offers a four-year curriculum leading to the Bachelor of Science degree. The curriculum is designed to prepare graduates for positions of responsibility in the printing and publishing industry or teaching graphic arts vocations in the high schools and junior colleges.

The program provides courses in general education together with a core of printing technology courses. The student is introduced to all stages of the printing processes during the first two years. A concentration in a specific field of graphic communications is selected for the junior and senior years. In addition, students are required to complete a number of courses in business administration or professional education, depending upon the concentration selected. A student who terminates his formal education prior to graduation will have sufficient training to qualify him for employment in the printing and publishing industry. However, the program is not designed to provide vocational education for the printing trade.

The Graphic Communications Department occupies 33,000 square feet of floor space in the modern Graphic Arts Building. Theory is taught in up-to-date classrooms incorporating the latest in teaching aids. Ten modern, well-equipped laboratories of printing equipment provide the student with diverse experience in the practical aspects of the industry.

Students seeking careers in business administration, architecture, journalism or other professions which commonly engage the services of printers or publishers will benefit significantly from an understanding of the printing processes, their requirements and limitations. The following courses are offered for non-majors only: Graphic Arts Processes (Gr C 127), Advanced Graphic Arts (Gr C 238), Screen Processes (Gr C 357), Survey of Lithography I (Gr C 338), Survey of Lithography II (Gr C 339). Non-majors will also find the following courses to be beneficial to acquiring a broad knowledge of printing processes: Introduction to Printing Technology (Gr C 101), Graphics (Gr C 104), Theory of Color (Gr C 201), Tape Perforation (Gr C 341).

CURRICULAR OPTIONS

Printing Management

This option is designed as a flexible program for the student interested in pursuing employment as a printing plant manager, planner, quality control specialist, production control specialist, estimator, or printing salesman. The program also prepares the student for employment as a technical representative for manufacturers of graphic arts machinery and products.

Printing Education

This option is designed for the student interested in teaching printing in junior and senior high schools. The program requires the student to graduate with a major in printing, an academic minor and selected courses in professional education. Completion of the program requires a fifth year of graduate work. The Standard Teaching Credential with Specialization in Secondary Teaching is granted upon successful completion of this program.

Graphic Design

Art-oriented students intending to seek careers in graphic arts design and production should enroll in this option. In addition to course offerings in graphic design, the option is designed to familiarize the student with technical limitations imposed upon the designer by the printing processes.

CURRICULUM IN GRAPHIC COMMUNICATIONS

	F	W	S
Freshman			
Introduction to Graphic Communications (Gr C 101)	2		
Graphics (Gr C 104)	3		
Printing Papers (Gr C 111)			2
Typography (Gr C 122)		4	
Binding and Finishing (Gr C 123)			3
Relief Plates (Gr C 126)			2
Letterpress (Gr C 132)		3	
Freshman Composition (Eng 104, 105)	3	3	
Technical Writing (Eng 219)			3
* Mathematical sciences	3		
* Physical sciences	4	4	4
Manufacturing processes (MP 127)		2	
General Psychology (Psy 202)			3
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 15½	<hr/> 16½	<hr/> 17½
Sophomore			
Theory of Color (Gr C 201)	2		
Introduction to Printing Management (Gr C 204)	2		
Copy Preparation for Reproduction (Gr C 223)		3	
Composing Machines (Gr C 224, 225)	3	3	
Process Camera (Gr C 227)	3		
Stripping and Platemaking (Gr C 228)		3	
Lithography (Gr C 229)			3
Letterpress (Gr C 233)			3
General Biology (Bio 101)	3		
Principles of Speech (Sp 200)		3	
Logic (Phil 202)			3
Introduction to Journalism (Jour 118)	2		
Health Education (PE 107)			2
Data Processing (CSc 100)		2	
* Literature		3	3
* Design Fundamentals (Art 221 or equivalent)	3		
* Economics			3
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 18½	<hr/> 17½	<hr/> 17½
Junior			
Estimating (Gr C 303)			3
Printing Equipment Maintenance (Gr C 326)			3
Plant Organization and Layout (Gr C 333)			3
Screen Processes (Gr C 357)	3		
** Automated Typesetting (Gr C 301)	3		
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
Electives and courses to complete major	7	13	4
	<hr/> 16	<hr/> 16	<hr/> 16

* To be selected with adviser approval in accordance with the General Education Requirement.
 ** Satisfactory skill in typing required for this course. A student who does not type may satisfy the requirement by electing Bus 141.

Graphic Communications

Senior	F	W	S
Photocomposition (Gr C 407)	3		
Printing Management (Gr C 421, 422)	3	3	
Graphic Communication Development (Gr C 459)			3
Senior Project (Gr C 461, 462)	2	2	
Undergraduate Seminar (Gr C 463)			2
Electives and courses to complete major	8	11	10
	16	16	15

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Graphic Communications and other subjects.

PRINTING MANAGEMENT OPTION (Add courses below to basic Curriculum)

Junior	Senior
Gr C 307 Purchasing for Printing	Gr C 401 Printing Sales
(2)	(2)
Gr C 312 Theory of Lithography (3)	Gr C 408 Newspaper Prod. Mgmt.
Actg 221-2 Principles of Accounting	(2)
(8)	Gr C 411 Estimating and Pricing (3)
Actg 223 Cost Accounting and Analysis	Gr C 423 Printing Management... (3)
(4)	FPM 342 Financial Management... (3)
Bus 301 Business Law Survey	Psy 302 Psychology of Business and Industry
(3)	(3)
Bus 321 Business Applications of Data Processing	
(3)	

PRINTING EDUCATION OPTION (Add courses below to basic Curriculum)

Junior	Senior
Jour 221 Basic Photography	Ed 312 Educational Psychology... (3)
(3)	Ed 421 Audio Visual Instruction: Methods and Materials
Gr C 334 Commercial Typography	(3)
(3)	Ed 401 Public Education in American Society
Eng 300 Advanced Compo- sition	(3)
(3)	Gr C 329 Reproduction Engineering
Gr C 312 Theory of Lithography	(3)
(3)	Ed 403 Teaching Procedures in the Secondary School
Gr C 307 Purchasing for Printing	(3)
(2)	Gr C 336 Advanced Letterpress... (3)
Gr C 335 Commercial Illustration (3)	Gr C 441 Applied Printing Tech.
	(3)

GRAPHIC DESIGN OPTION (Add courses below to basic Curriculum)

Junior	Senior
Art 222-3 Design Fundamentals... (6)	Art 431-2-3 Graphic Design
Art 331-2-3 Applied Design	(9)
(9)	Gr C 434 Color Separation
Gr C 335 Commercial Illustration (3)	(3)
Gr C 323 Pre-Separated Art for Camera	Gr C 441 Applied Printing Tech.
(3)	(3)
	Jour 421 Newspaper and Maga- zine Advertising
	(3)

HISTORY DEPARTMENT

Department Head, M. Eugene Smith

Timothy M. Barnes	G. Lynn Hales	Joseph B. Romney
Lloyd N. Beecher	Donald W. Hensel	Robert L. Rosenberg
Robert E. Burton	Scott J. Maughan	John G. Snetsinger
Ralph W. Dilts	Edward L. Mayo	Herman C. Voeltz
William E. Duvall	Barton C. Olsen	Jay C. Von Werlhof
James L. Fitts	Max E. Riedlsperger	William M. Wharton

The History Department serves all schools of the college by offering general education courses in American democracy and in world affairs. It also provides an undergraduate major in history built on a broad social science base leading to a bachelor of arts degree. The history major provides strong preparation for elementary and secondary teaching and for employment in government and business. A minor in history is available for teaching credential purposes.

CURRICULUM IN HISTORY

Freshman †	F	W	S
History of Civilization (Hist 101, 102, 103).....	3	3	3
Freshman Composition (Eng 104, 105, 106).....	3	3	3
Physical Education Activity (PE 141)	½	½	½
* Natural Science	3	3	3
Principles of Political Science (Pol Sc 101, 102, 105)	3	3	3
Mathematics for General Education (Math 100).....			3
Health Education (PE 107).....		2	
Electives	3	2	
Sophomore	15½	16½	15½
History of the United States (Hist 201, 202, 203).....	3	3	3
Physical Education Activity (PE 241)	½	½	½
* Natural Science	3	3	
Economics (Ec 211 or 201).....	3		
Principles of Sociology (Soc 201, 202)	3	3	
Public Speaking (Sp 201, 202).....		2	2
Cultural Anthropology (Ant 201).....			3
General Psychology (Psy 202).....			3
Electives	3	5	5
Junior	15½	16½	16½
European Historiography (Hist 301).....	3		
American Historiography (Hist 302).....		3	
U.S. in World Affairs (Hist 205)			3
U.S. History at 300-400 level		3	3
History (other than U.S.) at 300-400 level	3	3	3
** Literature	3	3	
** Literature or Philosophy			3
*** Electives	6	3	3
Senior	15	15	15
Senior Project (Hist 460)	2		
History at 300-400 level	3	3	6
Social Sciences (other than History) at 300-400 level	3	3	
** Philosophy or Art			3
*** Electives	7	9	6
	15	15	15

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in History and other subjects.

* Select according to General Education requirement; must include one sequence course for three quarters with a minimum of 9 units.

† Typing proficiency is required for graduation. A student who does not type may use one unit of elective credit to take Bus 141 to satisfy the requirement.

** To be selected in accordance with the General Education requirement.

*** At least 19 units must be at the 300-400 level. Two years of foreign language are highly recommended.

JOURNALISM DEPARTMENT

Department Head, John R. Healey

Vincent J. Gates
James H. Hayes
Donald N. Holt

Brent H. Keetch
Helen P. Kelley

Loren L. Nicholson
Ed J. Zuchelli

Modern journalism places a premium on specialists who have acquired familiarity with a specific field in addition to basic professional training. This college has trained "specialized journalists" exclusively. The Journalism Department offers a program leading to the bachelor of science degree in journalism with concentrations in different occupational areas of journalism—agricultural, community, industrial, and home economics.

All journalism majors must complete the basic curriculum which deals with fundamental journalistic aspects and supplementary courses in arts and sciences. Each major also must complete a certain number of required and elective courses in his particular field of concentration.

Regardless of concentration all journalism majors will be expected to serve as staff members on the school publications and news media and on journalism field teams. In addition to the 198 units required for a degree, the journalism major must complete an eight weeks' noncredit internship in a publishing, radio, advertising, public relations, business or industrial organization under an approved and supervised program. Such internships will take place normally during summers. Credit toward the internship requirement may be granted for journalism field team participation.

Enrollment in journalism courses is open to qualified students of all other departments who wish to gain skills in the techniques and methods of advertising, public relations, publicity, publications, and photography.

CURRICULAR CONCENTRATIONS

Agricultural Journalism

This concentration prepares for farm or farm-city careers in reporting, editing, radio and television news; publication production; advertising copywriting, layout, selling; public relations and publicity; photography; information. Twenty-one of the elective units must be chosen with the approval of the adviser.

Community Journalism

This concentration prepares for community newspaper operation and production; suburban news, advertising and business operation with emphasis on management and ownership; printing and publishing of small daily, weekly and semi-weekly publications; community broadcasting station operation and management. Twenty-three of the elective units must be chosen with the approval of the adviser.

Business and Industrial Journalism

This concentration provides training for editorial, advertising and promotion employment on trade and business publications and house organs; sales promotion, industrial relations and industrial publicity; production and management of specialized industrial publications and printing; internal and external public relations programming; trade association secretary-manager positions; advertising agency and broadcasting advertising with industrial emphasis; photography and graphic arts for industrial operations. Twenty-three of the elective units must be chosen with the approval of the adviser.

Home Economics Journalism

This concentration relates to women's publications; editorial, advertising and promotion; consumer organization public relations and sales promotion; community publications staff writing and editing with emphasis on women's home and family features; public utilities promotion and advertising of interest to homemaking and family interest groups; photography and broadcast news designed especially for women's special activities. Twenty-three of the elective units must be chosen with the approval of the adviser.

Broadcast Media

This concentration emphasizes the nonentertainment aspects of radio and television broadcasting. The emphasis is on training the professional radio and television newsmen in gathering, writing and presenting the news responsibly. Twenty of the elective units must be chosen with the approval of the adviser.

Public Relations Advertising

This concentration prepares a foundation in understanding the role of advertising and public relations in business and society; why the public relations and advertising function is important; methods used in the practice of advertising and public relations. Twenty of the elective units must be chosen with the approval of the adviser.

Photojournalism

This concentration prepares for opportunities in newspapers, magazines and television: training in still and movie film work, and in color and black and white. Emphasis is in using words and pictures together in understanding and interpreting today's society. Twenty-two units must be chosen with the approval of the adviser.

CURRICULUM IN JOURNALISM

Freshman †	F	W	S
Introduction to Journalism (Jour 118)	2		
Freshman Composition (Eng 104, 105, 106)	3	3	3
Introduction to Literature (Eng 207)			3
Physical Education Activity (PE 141)	½	½	½
Mathematics (Math 102, 103 or Math 100, 200)		3	3
Life Science	3	3	3
Basic Photography (Jour 221)	3		
Advanced Photography (Jour 222)		3	
§ Electives and courses to complete major	6	5	4
	17½	17½	16½
Sophomore			
Principles of Economics (Ec 211, 212)	3	3	
Physical Education Activity (PE 241)	½	½	½
American Literature (Eng 311, 312, 313)	3	3	3
Physical Science	4	4	4
Journalism History (Jour 201)	3		
News Writing (Jour 202)		3	
Reporting I (Jour 203)			3
Introduction to Sociology (Soc 105)			3
§ Electives and courses to complete major	3	4	3
	16½	17½	16½
Junior			
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
General Psychology (Psy 202)	3		
Health Education (PE 107)	2		
Graphic Arts Processes (Gr C 127)		3	
Editing and Copy Desk (Jour 233)		3	
Public Speaking (Sp 201)			2
Newspaper and Magazine Advertising (Jour 421)	3		
Advertising Layout and Copywriting (Jour 425)		2	
Broadcast Media News (Jour 333)			3
Senior Project (Jour 461)			2
§ Electives and courses to complete major	7	4	5
	18	15	15

§ From 18 to 27 of the elective units must be chosen with the approval of the adviser according to the field of concentration.

† Unless already acceptable typists, majors will be required to attain typing proficiency during their freshman year.

Journalism

Senior	F	W	S
State and Local Government (Pol Sc 401).....	3		
Feature Writing (Jour 302).....		3	
Global Geography (Geog 308).....			3
Senior Project (Jour 462).....	2		
Undergraduate Seminar (Jour 463).....			2
Applied Journalism Techniques (Jour 451, 452, 453).....	2	2	2
Journalism Press Laws (Jour 402).....		3	
Public Relations (Jour 412).....			3
§ Electives and courses to complete major.....	9	8	6
	<hr/> 16	<hr/> 16	<hr/> 16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Journalism and other subjects.

§ From 18 to 27 of the elective units must be chosen with the approval of the adviser according to the field of concentration.



MUSIC DEPARTMENT

Department Head, Harold P. Davidson

Alexander Capurso
Emanuel R. Heifetz

William V. Johnson
Ronald V. Ratcliffe

John G. Russell
Clifton E. Swanson

The purposes of the courses in the Music Department are to give all musically inclined students the opportunity to participate in college musical organizations and to further their proficiency both in singing and in playing instruments; to give all students interested in music a broader insight into the general field of music through courses in appreciation, theory, harmony, and music history; and to provide the prospective teacher with basic skills and instructional techniques in music required for the general elementary credential.

It is necessary that the student have some previous experience with a musical instrument in order to try out for band, brass, chamber, and orchestral ensembles, and for dance orchestra. While previous experience in choral singing is helpful, it is not mandatory for the student trying out for the men's glee club and the women's glee club.

Students enrolled in one of the teacher education majors may elect a teaching minor in music. This program requires that a minimum of 30 units be taken, at least 18 of which must be 300 or 400 numbered courses. Those interested in this program should consult an instructor in the Music Department. Demonstration of music skill in piano may be by audition or by satisfactory performance in Mu 111, 112, 113. Participation in a music activity for at least three quarters is recommended.

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Music and other subjects.

PHILOSOPHY DEPARTMENT

Department Head, James T. Culbertson

Arthur C. W. Bethel
Stanislaus J. Dundon
Maurice Hanna

Lloyd D. Hays
Wilbur C. Hogan
Russell A. Lascola

The courses offered in the Philosophy Department are intended to give the student a more comprehensive view of the world than he might otherwise get. The program in philosophy should supplement the courses he takes in his major and should help him understand the relation of his field to other investigations, particularly to scientific, religious and social movements. The courses call attention to the perennial questions reflective people have asked concerning man and his world, and help the student to develop his own personal philosophy.

This program will acquaint the student with the developments in metaphysics (the nature of reality), epistemology (the means by which knowledge is acquired), axiology (value theory), and logic.

The courses in the Philosophy Department give all students the opportunity to participate in philosophical discussion and further their proficiency in expounding and defending philosophical positions.

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Philosophy and other subjects.

SPEECH DEPARTMENT

Department Head, James R. Emmel

Robert L. Andreini
Robert L. Cleath
James R. Conway

Evelyn K. deVoros
Robin Lake

Keith E. Nielsen
J. Murray Smith

The Speech Department through its courses in speech, drama, and radio-television serves all schools of the College. Its offerings enable students to fulfill requirements in general education, to advance programs of preparation and vocational objectives in their chosen fields, and to enhance avocational pursuits and cultural development.

The primary objective of the department is to prepare prospective teachers of speech for positions in elementary and secondary schools. It also provides courses for students planning to enter many other fields related to the communicative arts and sciences.

The Speech Department offers an academic teaching major and a speech minor available to all teacher candidates. All speech majors must complete the basic speech curriculum and consult their advisers in the choice of electives to round out their programs and fulfill their minors. Both major and minor programs are geared not only to provide broad theoretical knowledge of the speech field, but also to give students extensive experience in diversified speech activities.

A variety of co-curricular activities is available for students interested in the speech arts. Intercollegiate forensic tournaments provide opportunities for Cal Poly speakers to compete with students from other universities and colleges in debate and other speech events. The college drama program annually presents six productions, three produced by the Speech Department, and three sponsored by the Drama Committee of College Program Boards. A broad spectrum of dramatic productions brings classical, musical, and modern plays to the college community. The college FM radio station KCPR provides experience for students in radio station operation, program production, and radio engineering. Additional speech activities include speechmaking to community audiences, programs of oral interpretation, and laboratory drama presentations.

CURRICULUM IN SPEECH

Freshman	F	W	S
Principles of Speech (Sp 200).....	3		
Introduction to Broadcasting, Debate, and Theater (Jour 214, Sp 215, Dr 220).....	3	3	3
Freshman Composition (Eng 104, 105, 106).....	3	3	3
History of Civilization (Hist 101, 102, 103).....	3	3	3
† Natural science	3	3	3
Physical Education Activity (PE 241).....	½	½	½
Electives		3	3
	15½	15½	15½
Sophomore			
Essentials of Discussion (Sp 217).....	3		
Forensic Activity (Sp 300).....	1		
Argumentation and Debate (Sp 301).....	3		
Voice and Phonetics (Sp 306).....		3	
Introduction to Fiction, Drama, Poetry (Eng 201, 202, 203).....	2	2	3
Mathematics for General Education (Math 100).....	3		
† Natural science		3	3
General Psychology (Psy 202).....		3	
Survey of Economics (Ec 201)			3
Health Education (PE 107).....			2
Physical Education Activity (PE 241).....	½	½	½
† Literature or Philosophy		3	
Electives	3	2	5
	15½	16½	16½

† To be selected in accordance with the General Education requirement.

Speech

Junior	F	W	S
Advanced Composition—Non-Fiction (Eng 304).....			3
Introduction to Speech Correction (Sp 302).....	3		
Industrial and Professional Speech (Sp 303).....	3		
Persuasion (Sp 304).....		3	
Oral Interpretation (Sp 305).....			3
Acting (Dr 320).....	3		
Directing (Dr 321).....		3	
American Government (Pol Sc 201).....	3		
Growth of American Democracy (Hist 204).....		3	
United States in World Affairs (Hist 205).....			3
* Electives	4	6	6
	16	15	15
Senior			
Introduction to Shakespeare (Eng 210).....			3
Stagecraft (Dr 322).....		2	
Discussion and Conference Leadership (Sp 403).....		2	
Advanced Oral Interpretation (Sp 405).....	2		
History and Criticism of Public Address (Sp 407, 408, 409).....	3	3	3
Biblical Reference in Speechmaking (Sp 410).....			3
Broadcast Media Practice (Jour 341).....	2		
Undergraduate Seminar (Sp 463).....	2		
Senior Project (Sp 461).....		2	
* Electives	6	6	6
	15	15	15

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Speech, Drama and other subjects.

* At least 15 units must be at the 300-400 level.



SCHOOL OF ENGINEERING AND TECHNOLOGY



CHART OF RECOMMENDED JUNIOR COLLEGE PREPARATION FOR ENGINEERING AND TECHNOLOGY MAJOR CURRICULA CALIFORNIA STATE POLYTECHNIC COLLEGE, SAN LUIS OBISPO

CAL POLY ENGINEERING MAJORS REQUIRING VARIOUS COURSES												
Qtr. Units	Aero	EE	EL	ET	EnvE	IE	IT	ME	TE	WM		
5				X X X X X			X X					
4	X X X X X	X X X X X	X X X X X		X X X X X			X X X X X	X X X X X	X X X X X		
4				X X X X	X X X X	X X X X	X X X	X X X X X	X X X X X	X X X X X		
4	X X X X X	X X X X X	X X X X X									
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SCHOOL OF ENGINEERING AND TECHNOLOGY

Archie Higdon, Dean

Charles R. Russell, Associate Dean

The Engineers' Council for Professional Development defines engineering "as the profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize economically the materials and forces of nature for the benefit of mankind."

Engineering at Cal Poly is strongly oriented toward preparing young people for immediate entry into the practice of engineering in the industrial world upon graduation from one of the four-year bachelor's degree programs. Each student selects his major as a freshman and takes at least one course per quarter in that major from the first quarter at Cal Poly. This process increases motivation to master the mathematics, basic science, and engineering science which constitute a very important half of each engineering curriculum.

Engineering graduates of Cal Poly are in great demand. They command high salaries and find an endless variety of engineering challenges awaiting them. They enter design, manufacturing, research, development, sales, maintenance, operation, etc. in industry, government, consulting firms, and many related activities. Increasing numbers find employment outside of the engineering profession in positions where an engineering education is either required or preferred.

Engineering curricula offered in the School of Engineering and Technology leading to the Bachelor of Science degree are: Aeronautical Engineering, Electrical Engineering, Electronic Engineering, Environmental Engineering, Industrial Engineering, Mechanical Engineering, Metallurgical Engineering, Transportation Engineering.

The School of Engineering also offers curricula leading to the Bachelor of Science degree in Engineering Technology and Industrial Technology and the Bachelor of Arts in Industrial Arts.

Engineering Technology is defined by the Engineers' Council for Professional Development as that part of the technological field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities, relating the craftsman to the field of engineering.

Industrial Technology provides professional preparation for students desiring careers in industrial sales, production supervision, industrial education, and closely related fields.

COOPERATIVE PROGRAMS

Attention is directed to the preceding chart on recommended junior college preparation for engineering and technology major curricula. This chart should be studied and followed in order to prevent loss of time in completing the program after transferring to Cal Poly. In addition this college grants credit for lower division work in accordance with provisions agreed upon in the Engineering Liaison Committee.

The School of Engineering and Technology offers cooperative work-study programs in which students gain practical experience by working in industry or government installations, usually every other quarter, alternating periods of work and study. Under a cooperative program the students receive experience in their profession plus income during work periods.

In general, students under these programs will require more time to complete curriculum requirements, depending upon the time of starting and the nature of the individual's work-study plan. The College attempts to place students in programs which are to their best educational and financial advantage.

Students in a cooperative program are considered by the College to be continuing students while they are employed in industry. They may reside in College housing during work periods and may attend student activities provided they pay the activity fee.

MASTER OF ENGINEERING DEGREE

The Master of Engineering curriculum offers a broadly based program supported by the entire School and the Agricultural Engineering Department in the School of Agriculture and Natural Resources. It is not primarily a program for specialization in any one engineering discipline. It is designed as an interdisciplinary program for the generalist, the project leader, instead of for the specialist in one particular area.

In more detail, the objectives of the program are to provide:

- 1. The appropriate job-entry education for the more complex areas of engineering such as research and development, innovative design, and systems analysis and design.
- 2. Both updating and upgrading opportunities for practicing engineers.
- 3. Appropriate graduate preparation for further graduate study in engineering leading to the Doctor of Engineering or Ph.D. degree.
- 4. Quality preparation for teachers of pre-engineering, engineering technology, and most aspects of undergraduate engineering curricula.
- 5. A useful graduate education for foreign students for use in their homelands.
- 6. An excellent base for lifelong individual study for the graduate to keep current in his profession.

CURRICULUM FOR THE MASTER OF ENGINEERING DEGREE
(For College requirements, see the *Graduate Study Bulletin*)

	Units
Engr 599—An interdisciplinary design project thesis. (Units per quarter 2, 2, 5)	9
Mathematical Science—at least one course at the 500 level and not more than one course at the 300 level.....	9
Engineering courses at the 500 level in a field in one engineering department	6
Engineering courses in a field in a second engineering department—at least one course at the 500 level and not more than one course at the 300 level	9
A physical, biological, or social science, or an engineering science not used above. The concept is to give further strength in one related area of interest at the 300 level or above, such as economics, psychology, physics, mechanics, computers, etc.	6
Free electives at the 300 level or above. In some cases, these courses may be needed to complete prerequisites for courses required above.....	6
	45**

** At least 24 units must be in courses organized primarily for graduate students (500 level).

AERONAUTICAL ENGINEERING DEPARTMENT

Department Head, Charles P. Davis

Alfred E. Andreoli
Thomas W. Carpenter
Lester W. Gustafson
Frank J. Hendel

Jon A. Hoffmann
Stuart E. Larsen
Clifford J. Price

Doral R. Sandlin
Robert E. Sennett
Donald E. Struble

The Aeronautical Engineering curriculum prepares students for engineering work dealing with the structure, propulsion, control, and ground support equipment for aircraft, missiles, and spacecraft. The problems faced by the aerospace industry offer an unusual engineering challenge. Much of the analysis must be accomplished at the very frontiers of knowledge yet products must nevertheless be designed and manufactured. Thus, an exceptionally wide gamut of engineering abilities is required within the industry.

The curriculum of the Aeronautical Engineering Department is accredited by the Engineers' Council for Professional Development. It places emphasis on both analysis and design. Supplementary to both is the basic work in drafting, shops, and laboratory. Throughout the entire four-year curriculum there is constant interplay between theory and application. Opportunities are available for advanced elective work in the student's field of special interest.

Graduates of the Aeronautical Engineering Department obtain employment in all phases of the aerospace industry such as general design, aerodynamics, stress analysis, flight testing, and field engineering.

The department has laboratories for fabrication, propulsion, structural test, and aerodynamics, and also has two design rooms and a hangar with adjoining airstrip.

The department sponsors a student chapter of the national society—the American Institute of Aeronautics and Astronautics.

CURRICULUM IN AERONAUTICAL ENGINEERING

Freshman	F	W	S
Aerospace Fundamentals (Aero 121, 122, 123)	2	2	2
* Manufacturing Processes	2	1	1
Digital Computer Applications (Engr 251)			2
Applied Descriptive Geometry (ET 141)	2		
Analytic Geometry and Calculus (Math 141, 142, 143)	4	4	4
General Physics (Phys 131, 132)		4	4
Freshman Composition (Eng 104)	3		
Introduction to Literature (Eng 207)			3
General Biology (Bio 101)	3		
General Psychology (Psy 202)		3	
Health Education (PE 107)		2	
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	$16\frac{1}{2}$	$16\frac{1}{2}$	$16\frac{1}{2}$
Sophomore			
Engineering Problems—Analog Computers (Aero 252)		1	
Strength of Materials (Aero 207)			5
Strength of Materials Laboratory (Aero 229)			1
Electric Circuit Theory (EE 201)		4	
General Physics (Phys 133)	4		
Engineering Mechanics (ME 211, 212)	3	4	
Analytic Geometry and Calculus (Math 241)	4		
Differential Equations (Math 242)		4	
Advanced Engineering Mathematics (Math 318)			4
General Chemistry (Chem 124, 125)		4	4
Introduction to Numerical Methods (CSc 332)			3
Survey of Economics (Ec 201)	3		
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
† Literature or Philosophy	3		
	$17\frac{1}{2}$	$17\frac{1}{2}$	$17\frac{1}{2}$

* To be selected from WM 141, 142, 251, 252; MP 141, 142, 143, 153, 154; IE 141.

† To be selected in accordance with the General Education requirement with adviser approval.

Aeronautical Engineering

Junior	F	W	S
Aerothermodynamics (Aero 301, 302, 303)	5	5	5
Aerodynamics (Aero 306)			5
Stress Analysis (Aero 324, 325)	4	4	
Analog Computer Techniques (Aero 322)	3		
Electronics (EL 321)	4		
Instrumentation and Control Systems (EL 322)			4
Materials Engineering (WM 306)		3	
American Government (Pol Sc 201)			3
Technical Writing (Eng 219)		3	
Electives	2	3	
	<hr/> 18	<hr/> 18	<hr/> 17
Senior			
Flight Mechanics (Aero 421)	3		
Aero Design (Aero 444, 445, 446)	4	4	4
Mechanical Vibrations (ME 316)		3	
Senior Project (Aero 461, 462)	2	2	
Undergraduate Seminar (Aero 463)			2
Gas Dynamics I (Aero 404)	3		
Aircraft and Missile Propulsion Systems (Aero 401)			4
Growth of American Democracy (Hist 204)	3		
U.S. in World Affairs (Hist 205)		3	
Human Values in Engineering (Hum 402)			3
† Humanities elective		3	
Electives		3	3
	<hr/> 15	<hr/> 18	<hr/> 16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Aeronautical Engineering and other subjects.

† To be selected in accordance with the General Education requirement with adviser approval.

ELECTRICAL ENGINEERING DEPARTMENT

Department Head, Fred W. Bowden

Warren R. Anderson
S. K. Datta
Richard K. Dickey
Saul Goldberg

William F. Horton
Russell Korsmeyer
Alexander Landyshev

Shien-Yi Meng
Herbert L. Miles
Jacob Sabto

The Electrical Engineering Department prepares the graduate for a career as a professional engineer dealing with electrical energy. It provides a broadly based curriculum, fully supported by auxiliary subjects which increase the graduate's competence to develop his professional career. Students in the department may prepare themselves for employment in the electrical industry which offers a wide range of activity, or they may plan to continue their formal education in graduate school. Graduates are encouraged to seek registration as professional engineers.

Design by the scientific method is the central theme of the curriculum, which is accredited by the Engineers' Council for Professional Development. This theme is incorporated into every possible course situation throughout the entire curriculum and it is emphasized through extensive laboratory course work. As the student's education progresses he is confronted with realistic problems and is expected to utilize his capabilities to (1) recognize the essential technical problems to be solved, (2) use the scientific method in arriving at solutions, (3) evaluate the problem solutions taking into consideration tolerances, economics, reliability, and social impact in addition to strictly technical matters.

Attention is called to courses EE 104, 154, and 209 which are especially structured to assist junior college transfer students in their transition to the department curriculum.

Students are encouraged to participate in the two clubs sponsored by the department: Student Branch of the Institute of Electrical and Electronic Engineers, a technical organization; and the Poly Phase Club, a social club.

CURRICULUM IN ELECTRICAL ENGINEERING

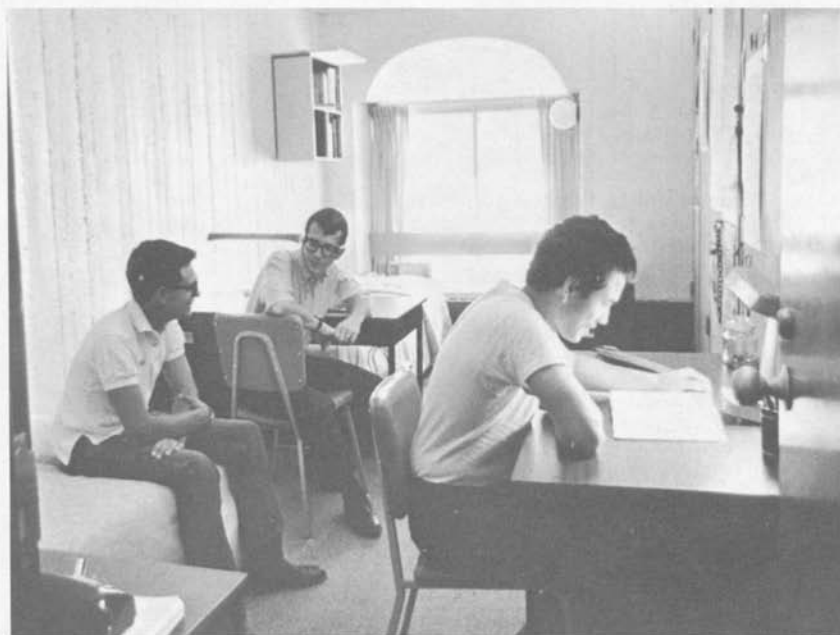
Freshmen	F	W	S
Basic Circuits and Devices (EE 131, 132)		3	3
Orientation (EE 110)	1		
Interpretation of Technical Drawings (ET 153)	1		
Graphics and Standards (EE 146)			1
Analytic Geometry and Calculus (Math 141, 142, 143)	4	4	4
General Chemistry (Chem 124, 125)	4	4	
General Physics (Phys 131, 132)		4	4
Freshman Composition (Eng 104)	3		
Technical Writing (Eng 219 or Eng 105)			3
Life science	3		
Manufacturing Processes (WM 141, 151)	1		1
Health Education (PE 107)		2	
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Sophomore	17$\frac{1}{2}$	17$\frac{1}{2}$	16$\frac{1}{2}$
Introduction to Electric Fields (EE 207)			4
Electric Circuits (EE 211, 212)	3	3	
Electric Circuits Laboratory (EE 251, 252)	1	1	
Analytic Geometry and Calculus (Math 241)	4		
Differential Equations (Math 242)		4	
Advanced Engineering Mathematics (Math 318)			4
Engineering Mechanics (ME 211, 212)	3	4	
Digital Computer Applications (Engr 251)			2
Materials Engineering (WM 306)			3
Survey of Economics (Ec 201)	3		
General Psychology (Psy 202)	3		
Literature			3
Literature or philosophy		3	
#Manufacturing Processes		1	1
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	17$\frac{1}{2}$	16$\frac{1}{2}$	17$\frac{1}{2}$

To be selected from IE 141; MP 141, 142, 143.

Electrical Engineering

Junior	F	W	S
Electromechanics (EE 304)	3		
Analysis of Engineering Systems (EE 301)	4		
Linear Analysis with Analog Computer (EE 323)		4	
Network Synthesis (EE 322)			4
Electronic Devices (EL 307)	4		
Electronic Devices Laboratory (EL 347)	1		
Electronic Circuits (EL 314, 316)		3	3
Electronic Circuits Laboratory (EL 344, 346)		1	1
Fluid Mechanics (ME 341)	3		
Growth of American Democracy (Hist 204)		3	
U. S. in World Affairs (Hist 205)			3
American Government (Pol Sc 201)	3		
Introduction to Optics and Atomic Physics (Phys 211)		4	
* Electives		3	4
	18	18	15
Senior			
Senior Project (EE 461)		2	
Undergraduate Seminar (EE 463)			2
Engineering Electromagnetics (EE 302)	4		
Heat Transfer (EnvE 313)		3	
Humanities elective		3	
Linear Control Systems I (EE 431)	4		
Thermodynamics (ME 302)	3		
Human Values in Engineering (Hum 402)			3
* Electives	6	9	11
	17	17	16

* 16 of the elective units must be chosen with the approval of the adviser.



ELECTRONIC ENGINEERING DEPARTMENT

Department Head, Evan R. Owen

Richard A. Bucich
Thomas T. L. Chou
Michael M. Cirovic
Edward J. Clerkin
Clifford B. Cloonan
Eugene D. Fabricius
Freeman Freitag

Alex M. Gernert
Michael Hawes
Harry Hazebrook
Harold J. Hendriks
Charles A. Herald
William B. Lindsay
John W. McCombs

Wayne E. McMorran
Larry D. Moore
John B. Rapp
Fred H. Steuck
James H. W. Tseng
Donley J. Winger
Chuan-Sung Yeh

Electronic Engineering is a recognized branch of engineering which provides society with devices and systems of broad utility. By electronics our senses and abilities are amplified and extended. Hearing (radio), seeing (television and radar), feeling (instrumentation), calculating (digital and analog computers), and many other operations can be performed electronically to extend man's power of control and scope of communication.

The curriculum, which is accredited by the Engineers' Council for Professional Development, is concerned primarily with the development, design, and application of devices and systems which can perform such functions. Hence, the laboratory, shop, drawing-room, and computer center activities are of equal importance with the classroom lecture activity, providing constant interplay between the theoretical and the experimental aspects of engineering. The student works in an environment which encourages him to derive creative satisfaction from the solution of technological problems under practical conditions.

Preparation for a career in engineering actually begins in high school with the study of mathematics and science. Continued emphasis is placed on these subjects in the college curriculum. However, the freshman will recognize that in addition to these subjects there is planned career-preparation which deals directly with electronics. Not only do these studies in electronics contribute to a practical know-how and understanding of phenomena, but they also support mathematics and physics by showing early application of these studies. By the end of the freshman year the student will have had the opportunity to solve some appropriate problems on digital and analog computers.

The core of the program emphasizes two areas of study in the sophomore and junior years: basic circuit theory using modern methods of analysis in the complex frequency plane and linear transform theory, and the physics and circuitry of linear and nonlinear electronic devices. Continued studies in mathematics, science and other technologies provide the analytical and scientific background for an understanding of solid-state, vacuum, and gas devices.

With the skills and understandings provided by the sophomore-junior year courses, the student is ready in the senior year for specialization-in-depth in some areas and exploration of several advanced subjects in the field of electronics, such as microwave electronics, advanced communication theory, control systems, and network synthesis. Quantum electronics is explored in physics for application to optical communication with coherent light and in micro-integrated circuitry. Through proper selection of electives, students may direct their studies along lines of special interest or more intensive theoretical preparation for graduate study. Students interested in business management may elect advanced related courses in this field.

In contrast with the course of study at most colleges, the extensive sequence of courses in general education is spread uniformly throughout the four years, proceeding from written and oral communication through psychology, literature, and history, to economics and political science.

The department occupies a large and modern facility which has been designed for polytechnic education. Included are facilities for station W6BHZ operated by the Amateur Radio Club. The department also has a student branch of the Institute of Electrical and Electronic Engineers.

Electronic Engineering

CURRICULUM IN ELECTRONIC ENGINEERING

	F	W	S
Freshman			
Basic Circuits and Devices (EL 131, 132)		3	3
Orientation (EL 110)	1		
Graphics and Standards (EL 146)			1
Life Science	3		
Interpretation of Technical Drawing (ET 153)	1		
* Manufacturing Processes	1		1
Analytic Geometry and Calculus (Math 141, 142, 143)	4	4	4
General Physics (Phys 131, 132)		4	4
Freshman Composition (Eng 104)	3		
Technical Writing (Eng 219 or Eng 105)			3
General Chemistry (Chem 124, 125)	4	4	
Health Education (PE 107)		2	
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<u>17½</u>	<u>17½</u>	<u>16½</u>
Sophomore			
Electric Circuits (EL 211, 212)	3	3	
Electric Circuits Laboratory (EL 251, 252)	1	1	
Introduction to Electric Fields (EL 207)			4
Analytic Geometry and Calculus (Math 241)	4		
Differential Equations (Math 242)		4	
Advanced Engineering Mathematics (Math 318)			4
Engineering Mechanics (ME 211, 212)	3	4	
Digital Computer Applications (Engr 251)			2
Materials Engineering (WM 306)			3
Literature			3
Literature or Philosophy		3	
General Psychology (Psy 202)	3		
Survey of Economics (Ec 201)	3		
Manufacturing Processes (WM 141, 151)		1	1
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<u>17½</u>	<u>16½</u>	<u>17½</u>
Junior			
Electron Devices (EL 307)	4		
Electron Devices Laboratory (EL 347)	1		
Linear Circuits Analysis (EL 301, 302)	3	3	
Networks Laboratory (EL 341, 342)	1	1	
Electronic Circuits (EL 314, 316)		3	3
Electronic Circuits Laboratory (EL 344, 346)		1	1
Logic and Switching Circuits (EL 319)			3
Analysis of Engineering Systems (EE 301)			4
Analog Computer Laboratory (EL 343)			1
Introduction to Optics and Atomic Physics (Phys 211)	4		
Thermodynamics (ME 302)		3	
Heat Transfer (EnvE 313)			3
American Government (Pol Sc 201)		3	
Humanities elective	3		
Growth of American Democracy (Hist 204)			3
Electives		3	
	<u>16</u>	<u>17</u>	<u>18</u>

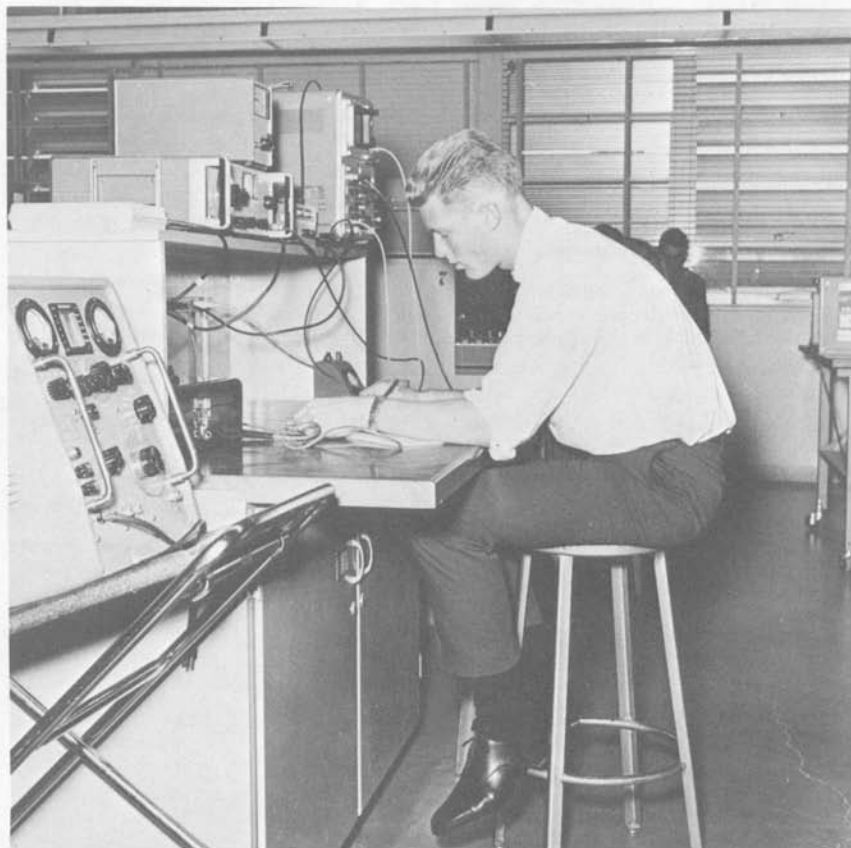
* Chosen from IE 141, MP 141, 142, 143.

Electronic Engineering

Senior	F	W	S
Electromagnetic Fields (EL 401).....	3		
Linear Control Systems (EE 431).....	4		
Electronic Engineering Reliability (EL 409).....		3	
Senior Project (EL 461, 462).....	2	2	
Undergraduate Seminar (EL 463).....			2
* Approved technical electives.....	4	4	9
Solid State Physics (Phys 412).....	3		
Solid State Physics Laboratory (Phys 452).....		1	
Human Values in Engineering (Hum 402).....			3
U. S. In World Affairs (Hist 205).....		3	
Electives		4	3
	16	17	17

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Electronic Engineering and other subjects.

* Must be selected with departmental approval.



ENGINEERING TECHNOLOGY DEPARTMENT

Department Head, James M. McGrath

Ray R. Allen	Earl R. Hesch	William J. Phaklides
Frederick M. Bergthold, Jr.	Robert M. Johnston	R. Wallace Reynolds
Ellard W. Betz	Irvin J. Kogan	J. O. Richardson
George S. Furimsky	Richard T. Kombrink	Leo E. Rogers
Theodore G. Graves	William E. Krupp	Alvin D. Varney
Richard E. Hall		

The Engineers Council for Professional Development defines engineering technology: "Engineering technology is that part of the technological field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational spectrum between the craftsman and the engineer."

The engineering technologist is somewhat more specialized than the engineer, focusing on a narrower range of subject matter and skills. In general, he has less depth in basic and engineering sciences but more specific capability and education in the skills areas and in the more routine aspects of design and production.

Each student will select an option from the following list for his area of specialization.

CURRICULAR OPTIONS

Air Conditioning-Refrigeration Technology

Emphasizes heating, ventilating, air distribution, air conditioning and refrigeration systems. It leads to specialization in the environmental control field.

Electronic Technology

Emphasizes experimental and laboratory phases of the field with coverage of the principles and theory necessary for full comprehension of electronic instruments and essential design problems for units and systems.

Manufacturing Processes Technology

This option emphasizes machine tools and is excellent preparation for the production field both in specialized uses of machines and in supervision of machine operators.

Mechanical Technology

Emphasizes applied machine design, mechanical equipment and systems, mechanisms, and production.

Welding Technology

Emphasizes all aspects of the welding field including techniques, nondestructive testing, power sources, and production problems.

CURRICULUM IN ENGINEERING TECHNOLOGY

Freshman	F	W	S
Elements of Electronics (ET 124).....	3		
Electrical Analysis (EE 122).....		4	
Manufacturing Processes (WM 141, 142).....	1		1
Manufacturing Processes (MP 143).....			1
Manufacturing Processes (MP 141).....	1		
Manufacturing Processes (MP 151).....	1		
Mathematics for Engineers (Math 117).....	5		
Technical Calculus (Math 131, 132).....		4	4
College Physics (Phys 121, 122).....		4	4
Freshman Composition (Eng 104, 105).....	3	3	
Health Education (PE 107).....			2
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives and courses to complete major.....	1		4
	<u>15½</u>	<u>15½</u>	<u>16½</u>

Engineering Technology

Sophomore	F	W	S
Applied Descriptive Geometry (ET 141)	2		
Engineering Drawing Systems (ET 142 or 122)		2	
Manufacturing Processes (IE 141)	1		
Fundamentals of Metallic Arc Welding (WM 151 or 155)		1	
Digital Computer Applications (Engr 251)		2	
Engineering Statics (ME 205)		3	
Electronic Instrument Practices (ET 125 or EL 113, 153)			4
Technical Calculus (Math 133)	4		
College Physics (Phys 123)	4		
General Inorganic Chemistry (Chem 121)		4	
Programming of Digital Computers (CSc 221)			3
Production Cost Estimating (IE 201)			3
Public Speaking (Sp 201)			2
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives and courses to complete major	5	4	4
	<u>16½</u>	<u>16½</u>	<u>16½</u>
Junior			
Mechanics of Materials (Aero 202)	5		
Metallurgy for Engineering Technology (WM 235)		4	
Engineering Dynamics (ME 206)		4	
Electric Machines (EE 231)			4
Elementary Probability and Statistics (Stat 211)	3		
Introduction to Literature (Eng 207)		3	
Technical Writing (Eng 219)			3
General Psychology (Psy 202)	3		
Survey of Economics (Ec 201)			3
Electives and courses to complete major	5	5	5
	<u>16</u>	<u>16</u>	<u>15</u>
Senior			
Senior Project (ET 461, 462)	2	2	
Undergraduate Seminar (ET 463)			2
Fluid Mechanics (ME 311)	3		
Thermodynamics (ME 301)		4	
*Life Science			3
Industrial Management (Mgt 311)			3
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
*Literature or philosophy	3	3	
Electives and courses to complete major	4	5	5
	<u>15</u>	<u>17</u>	<u>16</u>

AIR CONDITIONING-REFRIGERATION TECHNOLOGY OPTION

(Add Courses Below to Basic Curriculum)

Freshman	Junior
ET 121 Air Conditioning- Refrigeration Principles (4)	EnvE 201-2-3 Heating and Ventilating (7)
	ET 321 Air Distribution Systems.. (3)
Sophomore	Senior
ET 123 Environmental Graphics (2)	ET 331-2 Refrigeration Systems... (6)
ET 201 Air Conditioning Refrigeration Codes (2)	ET 423 Air Conditioning Systems (5)
EnvE 231-2-3 Fluid Systems (6)	ET 439 Instruments—Controls (3)

* To be selected in accordance with the General Education requirement.

Engineering Technology

ELECTRONIC TECHNOLOGY OPTION

(Add Courses Below to Basic Curriculum)

Freshman		Junior	
EL 131	Basic Circuits and Devices (3)	ET 233	Electronic Devices I..... (4)
		ET 341	Electronic Devices II..... (4)
Sophomore		ET 342	Communication Systems .. (4)
EL 132	Basic Circuits and Devices (3)	Senior	
ET 231	Basic Circuit Analysis..... (4)	ET 441	Digital Circuits (4)
ET 232	Electronic Circuits and	ET 442	Automation Technology..... (4)
Devices	(4)	ET 443	Microwave Technique (4)

MANUFACTURING PROCESSES TECHNOLOGY OPTION

(Add Courses Below to Basic Curriculum)

Freshman		Junior	
MP 125	Advanced Turning (3)	MP 321-2-3	Tool Design (9)
Sophomore		IE 232	Dimensional Metrology (2)
MP 142	Manufacturing Processes.. (1)	IE 233	Elements of Numerical Control Machining (2)
MP 154	Manufacturing Processes.. (1)	Senior	
MP 221	Abrasive Machining and Finishing (2)	MP 434, 5, 6	Tool and Manufac- turing Engineering (12)
MP 222	Advanced Machining Processes (3)		
ET 344	Advanced Design Graphics (2)		

MECHANICAL TECHNOLOGY OPTION

(Add Courses Below to Basic Curriculum)

Freshman		Junior	
ET 137	Elements of Machinery.... (3)	Aero 229	Strength of Materials Lab (1)
Sophomore		ET 320	Mechanisms (4)
MP 142	Manufacturing Processes (1)	ET 337	Instrumentation of Mechanical Systems (3)
ET 143	Engineering Graphics..... (2)	ET 344	Advanced Design Graphics (2)
IE 214	Production Control..... (3)		
IE 232	Dimensional Metrology..... (2)		
IE 233	Numerical Control Machining (2)		
ET 237	Hydraulic Device Applications (4)	ET 421	Applied Machine Design (4)
		ET 422	Applied Machine Design (4)
		ET 437	Design of Mechanical Systems (4)

WELDING TECHNOLOGY OPTION

(Add Courses Below to Basic Curriculum)

Sophomore		Senior	
WM 359	Advanced Welding (1)	IE 314	Production Control (2)
ET 235	Nondestructive Testing.... (5)	ET 434-5-6	Welding Design (9)
ET 236	Welding Power Sources.. (3)	MP 431	Tool Engineering (3)
		IE 232	Dimensional Metrology..... (2)
Junior			
ET 324-5-6	Advanced Welding Technology (13)		

See **COURSES OF INSTRUCTION** section of this catalog for descriptions of courses in Engineering Technology, Manufacturing Processes and other subjects.

ENVIRONMENTAL ENGINEERING DEPARTMENT

Department Head, Walter E. Holtz

Ray R. Allen
Harold M. Cota

Jan Doctor
Rodney G. Keif

Dragoslav M. Misić
Philip W. B. Niles

Environmental Engineering is concerned with the interrelation of man, materials, and processes in a complex and changing environment. The broad field of Environmental Engineering includes Control of Air and Water Pollution, Industrial Hygiene, Reduction of Noise and Vibration, Air Conditioning, Heating, Ventilation, and Refrigeration.

The program offers a sound background in the fundamentals of thermodynamics, heat transfer, fluid mechanics, mass transfer, and physico-chemical characteristics of living and inanimate matter. The student will specialize in one of the curricular concentrations described below. The problem-oriented approach to instruction, in modern well-equipped laboratories, shops and design rooms, provides the student an excellent opportunity to gain understanding and experience as a joint exploration with the faculty.

Student branches of the American Society of Heating, Refrigeration, and Air Conditioning Engineers and of the Institute of Environmental Sciences offer a vigorous program of technical and other activities, including field trips each year to the Los Angeles and San Francisco areas to study typical installations of systems. Student memberships are also available in the Air Pollution Control Association.

Graduates obtain employment primarily with consulting engineers, manufacturers, contractors, and governmental agencies.

CURRICULAR CONCENTRATIONS

Air Conditioning and Refrigeration

This concentration prepares students to enter those phases of engineering dealing particularly with thermal systems and their control in a variety of applications ranging from cold storage plants and modern buildings to hypersonic aircraft and missiles.

Air Pollution Control

This concentration provides training in the field of air pollution control. An engineering approach to the subject prepares the student to enter careers in air quality management, and industrial, public and private agencies concerned with solving problems of air pollution.

CURRICULUM IN ENVIRONMENTAL ENGINEERING

Freshman	F	W	S
Applied Descriptive Geometry (ET 141).....	2		
Environmental Graphics (ET 122, 123).....		2	2
Manufacturing Processes (MP 143).....	1		
Analytic Geometry and Calculus (Math 141, 142, 143).....	4	4	4
General Physics (Phys 131, 132).....		4	4
Freshman Composition (Eng 104, 105).....		3	3
General Psychology (Psy 202).....	3		
General Chemistry (Chem 124, 125).....	4	4	
†Science elective.....			4
Physical Education Activity (PE 141).....	½	½	½
General Biology (Bio 101).....	3		
	17½	17½	17½

† Selection to be approved by adviser.

Environmental Engineering

Sophomore	F	W	S
Heating and Ventilating (EnvE 201, 202)	3	2	
Fluid Systems (EnvE 231)	2		
Digital Computer Applications (Engr 251)	2		
Analytic Geometry and Calculus (Math 241)	4		
# Manufacturing Processes	1	2	
Differential Equations (Math 242)		4	
Advanced Engineering Mathematics (Math 318)			4
Mathematics of Statistics (Stat 321)		3	
Engineering Mechanics (ME 211, 212)		3	4
General Physics (Phys 133)	4		
Strength of Materials (Aero 207)			5
Physical Education Activity (PE 241)	½	½	½
Health Education (PE 107)		2	
§ Electives and courses to complete major		2	4
	16½	18½	17½
Junior			
Automatic Process Control (EnvE 316)			2
Thermodynamics (ME 302)	3		
System Design (EnvE 341, 342)	2	2	
Noise and Vibration Control (EnvE 307)	2		
Thermal and Fluids Laboratory (EnvE 331, 332)	2	2	
Heat Transfer (EnvE 313)			3
Environmental Air Quality (EnvE 325)	3		
Introduction to Literature (Eng 207)			3
Electric Circuit Theory (EE 201)		4	
Fluid Mechanics (ME 341)		3	
American Government (PoSc 201)			3
§ Electives and courses to complete major	4	5	7
	16	16	18
Senior			
Advanced System Design (EnvE 441)	2		
Advanced Mass and Energy Transfer (EnvE 401)	3		
Senior Project (EnvE 461, 462)	2	2	
Undergraduate Seminar (EnvE 463)			2
Electronics (EL 321)	4		
* Literature or Philosophy			3
* Humanities			3
Growth of American Democracy (Hist 204)	3		
The U.S. in World Affairs (Hist 205)		3	
Human Values in Engineering (Hum 402)			3
Survey of Economics (Ec 201)		3	
§ Electives and courses to complete major	3	10	3
	17	18	14

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Environmental Engineering and other subjects.

* To be selected in accordance with the General Education requirements.

§ 29 of the elective units must be chosen with the approval of the adviser according to the field of concentration.

To be selected from MP 141, 142; IE 141; WM 141, 142.

INDUSTRIAL ENGINEERING DEPARTMENT

Department Head, Donald E. Morgan

George W. Cockriel
Frederick F. Fennema

Millard J. Fotter
James R. Golden

George E. Hoffman
Paul E. Scheffer

Industrial Engineering is concerned with engineering systems and management systems. The analysis and synthesis of engineering systems utilizes and coordinates men, money, equipment, and materials to produce the desired quantity and quality of output, usually goods, at a specified time at minimum cost. The analysis and synthesis of management systems effectively utilizes the human resources through quantitative management decision models and management principles.

The industrial engineer becomes involved in the widest possible range of engineering activities including production, facilities planning, forecasting, quality and reliability assurance, systems economy, human factors and motivation, systems analysis, operations research, optimum resource allocation, data management, and the metrology of engineering test designs.

The curriculum, accredited by the Engineers' Council for Professional Development, is oriented to provide industry with graduates available to perform with a minimum of additional training, and yet prepare students for successful entry into graduate level study.

Industrial engineering laboratories and equipment are used from matriculation until graduation to investigate and test theoretical principles.

CURRICULAR CONCENTRATIONS

Production Concentration

A selection of courses stressing the synthesis and improvement of the production process utilizing statistics, economics, operations research, social sciences, human factors, principles of management, and manufacturing methods.

Systems Concentration

A selection of courses stressing the analysis and synthesis of systems. Mathematical and statistical models for management planning and control including the concepts of human factors, information theory, and data feedback as applied to productive systems.

CURRICULUM IN INDUSTRIAL ENGINEERING

Freshman	F	W	S
Introduction to Industrial Engineering (IE 101).....	3		
Engineering Methods (IE 122).....		2	
Industrial Systems Analysis (IE 123).....			3
General Chemistry (Chem 124, 125).....		4	4
* Manufacturing Processes	1	1	2
Engineering Graphics (ET 151).....	2		
Analytic Geometry and Calculus (Math 141, 142, 143)	4	4	4
General Physics (Phys 131, 132)		4	4
Freshman Composition (Eng 104).....	3		
§ Life Science elective.....	3		
Health Education (PE 107)		2	
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	16½	17½	17½

* MP 141, 142, 143; IE 141; WM 141, 142.

§ To be selected in accordance with the General Education requirement.

Industrial Engineering

Sophomore	F	W	S
Manufacturing Engineering Laboratory (IE 251)	3		
Industrial Costs and Controls (IE 239)		3	
Man-Machine Systems (IE 223)			3
Digital Computer Applications (Engr 251)	2		
Analytic Geometry and Calculus (Math 241)	4		
Differential Equations (Math 242)		4	
Mathematics of Statistics (Stat 321)			3
General Physics (Phys 133)	4		
Technical Writing (Eng 219)	3		
Engineering Mechanics (ME 211, 212)		3	4
Electric Circuit Theory (EE 201)		4	
Electronics (EL 321)			4
General Psychology (Psy 202)			3
Physical Education Activity (PE 241)	½	½	½
* Electives		3	
	16½	17½	17½
Junior			
Operations Research (IE 304, 305)	3	3	
Industrial Linear Systems (IE 309)			3
Manufacturing Design (IE 343)			4
Statistical Quality Control (IE 336)		3	
Human Factors I (IE 319)			3
Strength of Materials (Aero 207)	5		
Instrumentation and Control Systems (EL 322)			4
Mathematics of Statistics (Stat 322)	3		
Fluid Mechanics (ME 341)			3
Thermodynamics (ME 302)		3	
Principles of Economics (Ec 211, 212)	3	3	
Introduction to Literature (Eng 207)	3		
American Government (PolSc 201)		3	
* Electives		3	
	17	18	17
Senior			
Engineering Economy (IE 414)	3		
Fundamentals of Supervision (IE 441, 442)	2		1
Senior Project (IE 461, 462)	2	2	
Undergraduate Seminar (IE 463)			2
Growth of American Democracy (Hist 204)	3		
U.S. in World Affairs (Hist 205)		3	
Human Values in Engineering (Hum 402)			3
§ Literature or Philosophy elective		3	
§ Humanities elective			3
* Electives	7	8	7
	17	16	16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Industrial Engineering and other subjects.

* 18 or 19 of the elective units must be chosen with the approval of the adviser in a field of concentration.

§ To be selected in accordance with the General Education requirement.

INDUSTRIAL TECHNOLOGY DEPARTMENT

Department Head, J. M. McRobbie

Fred Abitia
Frank B. Barrows
William L. Bruckart
David H. Fretwell

J. D. Frost
Roger L. Keep
Kenneth R. Kimball
N. L. Smith, III

J. Edward Strasser
Laurence F. Talbott
Raymond A. Wysock

The Industrial Technology Department offers two curricula which prepare graduates for employment in a broad range of professional positions in industrial management, industrial production, industrial marketing or industrial and public education. For those interested in employment in industry the course offerings qualify students for occupations in the mid-ground between engineering and business. For those planning, with a fifth year, to teach the technical subjects of industry there are both broad and specific offerings concerning course content and methods in all the major areas.

Emphasis is placed upon the study of tools, machines, materials, processes and products. Special consideration is given to the industrial application of mathematics, physics and chemistry. Also of major importance is the development of the ability to work with people concerning matters of a technical nature.

Each student gains a substantial general education through courses in the areas of language communication, social sciences, mathematics, physical education and the arts. His ability to communicate in technical areas is further developed through courses in technical writing and technical drawing.

The Industrial Technology Department's facilities provide for instruction and laboratory experiences in drafting, wood technology, electricity, electronics, metal technology, power technology, and graphic arts.

CURRICULUM IN INDUSTRIAL TECHNOLOGY

This Bachelor of Science degree program emphasizes preparation for technical leadership responsibilities with a broad variety of industries including manufacturing, communication, transportation and utility services. Graduates in the field of industrial technology function in the mid-ground between the applied aspects of engineering and administration. Students who enjoy working primarily with people in solving technical problems are particularly well suited for careers in industrial technology. Preparation for professional specialization in industrial sales, supervision of production, plant facilities, or quality assurance technology is provided through the selection of technical electives with adviser approval.

Freshman	F	W	S
Technical Computation (IT 101).....	2		
Introduction to Industrial Technology (IT 111).....	2		
Fundamentals of Technical Drawing (ET 151).....			2
*Manufacturing Processes	1	2	1
College Algebra and Trigonometry (Math 117).....	5		
Technical Calculus (Math 131).....			4
Freshman Composition (Eng 104, 105).....	3	3	
College Physics (Phys 121, 122).....		4	4
General Biology (Bio 101).....			3
Health Education (PE 107).....			2
Physical Education Activity (PE 141).....	½	½	½
Electives	2	6	
	15½	15½	16½

* Chosen from MP 141, 142, 143, IE 141, WM 141, 142.

Industrial Technology

Sophomore	F	W	S
Marketing Principles (Mktg 204).....	4		
Industrial Electricity (IT 237).....	5		
**Elementary Probability and Statistics (Stat 211).....		3	
**Statistical Methods (Stat 212).....			3
Humanities elective.....		3	
Principles of Economics (Ec 211, 212).....	3	3	
Principles of Accounting (Actg 221, 222).....		4	4
Public Speaking (Sp 201).....	2		
College Physics (Phys 123).....			4
Literature elective.....			3
Physical Education Activity (PE 241).....	½	½	½
Electives.....	2	3	1
	<hr/> 16½	<hr/> 16½	<hr/> 15½
Junior			
Electrical Systems (IT 331, 332, 333).....	4	4	3
Product Evaluation (IT 326).....			2
Industrial Design (IT 346).....			2
Power Technology (IT 222, 223).....		2	2
Technical Sketching (IT 245).....		2	
Industrial Management (Mgt 311).....	3		
Business Law Survey (Bus 301).....		3	
General Inorganic Chemistry (Chem 121, 122).....	4		4
General Psychology (Psy 202).....	3		
Introduction to Philosophy (Phil 201).....		3	
† Electives.....	2	2	3
	<hr/> 16	<hr/> 16	<hr/> 16
Senior			
Mechanical Systems (IT 431, 432, 433).....	3	3	3
Industrial Product Development (IT 407).....	3		
Technical Management Problems (IT 418).....		4	
Industrial Marketing (IT 405).....			2
Modern Industrial Materials (IT 429).....			2
Senior Project (IT 461, 462).....	2	2	
Undergraduate Seminar (IT 463).....			2
Business & Human Relations (IR 415).....	3		
American Government (Pol Sc 201).....	3		
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 205).....			3
† Electives.....	2	4	4
	<hr/> 16	<hr/> 16	<hr/> 16

** Consult with adviser. Stat 321-322 should be substituted for Stat 211-212 as prerequisites depending on the adviser-approved electives.

† 15 of the elective units in the junior and senior years must be chosen with the approval of the adviser.

CURRICULUM IN INDUSTRIAL ARTS

This major provides for the undergraduate professional preparation of future industrial education teachers at the secondary and junior college levels. Students select one concentration from the following six industrial areas: Automotives, Drafting, Electronics, Graphic Arts, Metals or Wood-Plastics. In addition to specialization in one field, the student receives a broad basic training in all of these specialties. Graduates of this major have an extensive understanding of industrial manufacturing procedures plus the ability to work well with students in helping them to become familiar with processes of industry. The program leads to a Bachelor of Arts degree.

The Standard Teaching Credential, with specialization in secondary teaching, is granted upon successful completion of this program and a fifth year of professional education courses and graduate work in the major field. Graduates with industrial experience may qualify for positions of responsibility with in-plant technical training programs.

Freshman	F	W	S
Technical Computation (IT 101).....	2		
Introduction to Industrial Technology (IT 111).....	2		
Fundamentals of Technical Drawing (ET 151).....	2		
#Manufacturing Processes.....	2	2	2
Industrial Wood Processes (IT 125).....		2	
Graphic Arts Processes (Gr C 127).....			3
College Algebra and Trigonometry (Math 117).....	5		
Freshman Composition (Eng 104, 105).....	3	3	
College Physics (Phys 121, 122).....		4	4
General Biology (Bio 101).....			3
Health Education (PE 107).....		2	
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
*Electives and courses to complete major.....		2	2
	<hr/> 16 $\frac{1}{2}$	<hr/> 15 $\frac{1}{2}$	<hr/> 14 $\frac{1}{2}$
Sophomore			
Industrial Electricity (IT 237).....		5	
Wood Technology (IT 353).....			3
Advanced Graphic Arts (Gr C 238).....		3	
Advanced Composition (Eng 300).....		3	
Public Speaking (Sp 201).....	2		
Elementary Probability and Statistics (Stat 211).....		3	
Humanities elective.....	3		
Survey of Economics (Ec 201).....	3		
Introduction to Literature (Eng 207).....			3
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
*Electives and courses to complete major.....	6	1	10
	<hr/> 14 $\frac{1}{2}$	<hr/> 15 $\frac{1}{2}$	<hr/> 16 $\frac{1}{2}$

* From 23 to 26 of the elective units must be chosen with the approval of the adviser in a field of concentration. A minimum of 18 of these must be at the 300-400 level.

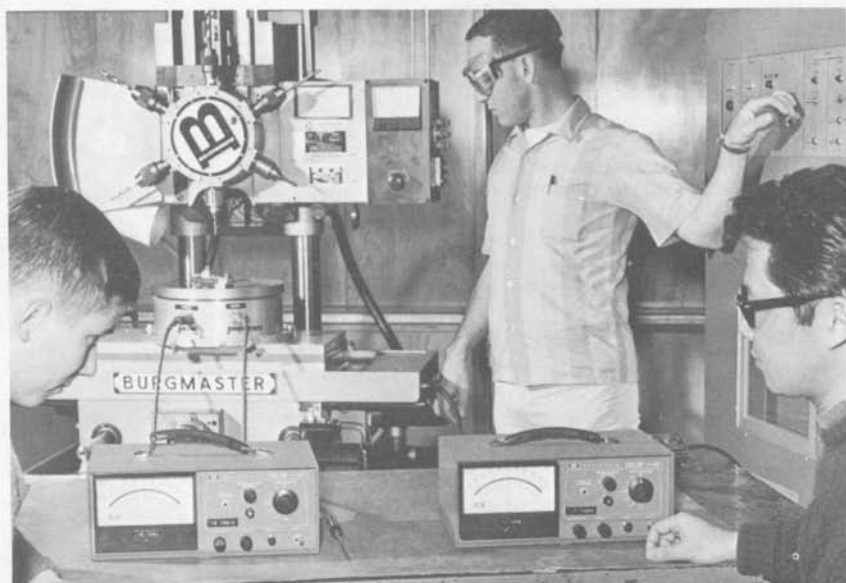
MP 141, 142, IE 141, WM 141, 142, EnvE 141.

Industrial Technology

Junior	F	W	S
Power Technology (IT 222, 223)		2	2
Technical Sketching (IT 245)		2	
Product Evaluation (IT 326)			2
Plastics Technology (IT 327)		2	
Industrial Design (IT 346)			2
Audio Visual Training for Business and Industry (Ed 422)	3		
General Inorganic Chemistry (Chem 121)	4		
Physical Science (Chem 122 or Phys 123)			4
General Psychology (Psy 202)	3		
Educational Psychology (Ed 312)		3	
Introduction to Philosophy (Phil 201)		3	
Public Education in American Society (Ed 401)	3		
*Electives and courses to complete major	3	4	5
	16	16	15
Senior			
Mechanical Systems (IT 433)			3
Modern Industrial Materials (IT 429)			2
Principles and Practices of Industrial Arts (IT 330)			5
Approved 300-400 IT courses	3	3	
Industrial Relations (IR 214)	3		
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
Senior Project (IT 461, 462)	2	2	
Undergraduate Seminar (IT 463)			2
*Electives and courses to complete major	4	7	1
	15	15	16

See COURSES OF INSTRUCTION section of the catalog for description of courses in Industrial Technology and other subjects.

* From 23 to 26 of the elective units must be chosen with the approval of the adviser in a field of concentration. A minimum of 18 of these must be at the 300-400 level.



MECHANICAL ENGINEERING DEPARTMENT

Department Head, John J. Kane

Robert W. Adamson
James G. Andresen
Edward H. Baker
Ian C. Begg
Chester O. Bishop
Laurence H. Carr
Franklin S. Crane

Otto C. Davidson
Edward R. Garner
Raymond G. Gordon
Roger A. Keech
Fredrick B. Malmborg
Leon F. Osteyee
John Price

Robert S. Rudland
Ramesh T. Shah
Edward O. Stoffel
Howard F. Stoner
Robert N. Sykes
Herman West

Mechanical engineering concerns itself primarily with the design, construction, and use of a wide variety of equipment ranging from manufacturing machinery and power generation equipment to consumer goods. Of primary concern to the mechanical engineer is the proper application of rigid, fluid, and thermal mechanics in the design and use of this equipment.

Graduates obtain employment primarily with manufacturers, contractors, public utilities, and governmental agencies. Types of work performed by graduates include design, engineering sales, engineering test, supervision of manufacture and erection.

The curriculum gives the student a thorough grounding in mechanical engineering and a choice of a curricular concentration in nuclear engineering or in general professional specialties as approved by his adviser. Engineering courses are found in all four years. In the junior and senior years, the professional specialties include such courses as turbomachinery, mechanical design, heat and mass transfer, mechanical control systems, and nuclear power plants. The curriculum is accredited by the Engineers' Council for Professional Development.

Laboratories are an important part of the student's education. He is enrolled in mechanical engineering laboratories from the beginning of his freshman year until his graduation. These laboratories include work in power generation, fluid flow, heat transfer, vibration, strength of materials, and others.

There are two organized student clubs in the Mechanical Engineering Department: a student branch of the Society of Automotive Engineers and the Mechanical Engineering Society. These clubs offer students an active program of professional and social activity.

CURRICULUM IN MECHANICAL ENGINEERING

Freshman	F	W	S
#Mechanical Systems (ME 134, 136).....	4		4
#Mechanical Engineering Laboratory (ME 145).....		1	
Engineering Graphics (ET 141, 142).....	2	2	
Analytic Geometry and Calculus (Math 141, 142, 143).....	4	4	4
* Manufacturing Processes	2	2	
General Chemistry (Chem 124, 125).....	4	4	
General Physics (Phys 131).....			4
Freshman Composition (Eng 104, 105).....		3	3
Health Education (PE 107)			2
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 16 $\frac{1}{2}$	<hr/> 16 $\frac{1}{2}$	<hr/> 17 $\frac{1}{2}$

* MP 141, 142; IE 141; WM 141, 142.

Qualified transfer students may, with departmental approval, substitute ME 234 and 5 units of approved technical electives.

Mechanical Engineering

Sophomore	F	W	S
Engineering Mechanics (ME 211, 212).....	3	4	
Strength of Materials (Aero 207).....		5	
Strength of Materials Laboratory (Aero 229).....			1
Digital Computer Application (Engr 251).....	2		
Materials Engineering (WM 306).....			3
Materials Engineering Laboratory (WM 341).....			1
Calculus, Differential Equations (Math 241, 242).....	4	4	
Advanced Engineering Mathematics (Math 318).....			4
General Physics (Phys 132, 133).....	4	4	
Survey of Economics (Ec 201).....			3
* Manufacturing Processes			1
† Literature	3		
General Psychology (Psy 202)			3
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<hr/> 16½	<hr/> 17½	<hr/> 16½
Junior			
Introduction to Design (ME 427).....		4	
Thermodynamics (ME 302, 303).....	3	3	
Fluid Mechanics (ME 341, 342).....	3		4
Mechanical Vibrations (ME 316).....			3
Vibrations Laboratory (ME 317).....			1
Heat Transfer (EnvE 313).....			3
Electric Circuit Theory (EE 201).....	4		
Electronics (EL 321).....		4	
Instrumentation and Control Systems (EL 322).....			4
** Introduction to Optics & Atomic Physics (Phys 211).....	4		
Growth of American Democracy (Hist 204).....			3
American Government (Pol Sc 201).....		3	
† Literature or Philosophy		3	
†† Electives and courses to complete major	3		
	<hr/> 17	<hr/> 17	<hr/> 18
Senior			
Design (ME 428)	4		
Thermodynamics Laboratory (ME 343).....		1	
Senior Project (ME 461, 462)	2	2	
Undergraduate Seminar (ME 463).....			2
U.S. in World Affairs (Hist 205).....		3	
Energy Conversion Electromagnetics (EE 325).....	4		
Human Values in Engineering (Hum 402).....			3
† Life Science			3
† Humanities		3	
†† Electives and courses to complete major.....	7	8	9
	<hr/> 17	<hr/> 17	<hr/> 17

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Mechanical Engineering and other subjects.

* MP 141, 142; IE 141; WM 141, 142.

** Phys 212 and 1 unit technical elective may be substituted.

† To be selected with adviser approval in accordance with the General Education requirement.

†† Of the total electives, 18 units must be chosen with the approval of the adviser in the student's field of concentration.

TRANSPORTATION ENGINEERING DEPARTMENT

Coordinator: Edward H. Baker

Transportation Engineering is concerned with all types and facets of the transportation problems of the State and the nation. It is a program related to Civil Engineering in several ways but is unique in its emphasis on all aspects of transportation and related or auxiliary facilities.

The transportation engineer faces a never ending series of interesting and difficult problems to meet the constantly increasing requirements for mobility of our people. Students completing this program qualify for positions in local, state and federal government service as well as highway, airfield, and dock construction firms to mention only a few areas of possible employment.

The curriculum includes surveying, structures, and transportation all based on broad general coverage of the engineering sciences, the basic sciences including mathematics, the social sciences, and the humanities. The program is oriented toward the practical problems of the industrial world but adequate scientific depth is maintained so that graduates will be readily accepted into graduate programs in transportation.

CURRICULUM IN TRANSPORTATION ENGINEERING

Freshman	F	W	S
Applied Descriptive Geometry (ET 141).....	2		
Engineering Drawing Systems (ET 142).....		2	
Engineering Surveying (AE 237).....			2
Engineering Problems—Digital Computers (Engr 251).....			2
*Manufacturing Processes.....	1		2
Analytic Geometry and Calculus (Math 141, 142, 143).....	4	4	4
General Chemistry (Chem 124, 125).....	4	4	
General Physics (Phys 131).....			4
Freshman Composition (Eng 104, 105 or 219).....	3	3	
Introduction to Literature (Eng 207).....			3
Life Science elective.....		3	
Health Education (PE 107).....	2		
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	16 $\frac{1}{2}$	16 $\frac{1}{2}$	17 $\frac{1}{2}$
Sophomore			
Strength of Materials (Aero 207).....			5
Engineering Mechanics (ME 211, 212).....	3	4	
Strength of Materials Laboratory (Aero 229).....			1
Engineering Surveying (AE 238, 239).....	2	2	
*Manufacturing Processes.....			1
Analytic Geometry and Calculus (Math 241).....	4		
Differential Equations (Math 242).....		4	
Mathematics of Statistics (Stat 321).....			3
General Physics (Phys 132, 133).....	4	4	
General Psychology (Psy 202).....			3
Principles of Economics (Ec 211, 212).....	3	3	
Introduction to Urban Environment (CRP 211).....			3
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	16 $\frac{1}{2}$	17 $\frac{1}{2}$	16 $\frac{1}{2}$

* Select from MP 141, 142, 143; IE 141; WM 141, 142.

Transportation Engineering

Junior	F	W	S
Transportation Materials (TE 329).....			2
Introduction to Traffic Problems and Transportation (TE 321)		4	
Operations Research (IE 304).....	3		
Stress Analysis (Arch 304).....	3		
Steel & Timber Structures (Arch 305).....		3	
Fluid Mechanics (ME 341, 342).....	3		3
Soil Mechanics and Foundations (Arch 421).....		3	
Concrete & Masonry Structures (Arch 404).....			2
Electric Circuit Theory (EE 201).....			4
Materials Engineering (WM 306)		4	
Physical Geology (Geol 201).....	3		
Mathematics of Statistics (Stat 322).....	3		
American Government (Pol Sc 201).....		3	
Growth of American Democracy (Hist 204).....			3
**Literature or Philosophy.....	3		
**Humanities			3
	18	17	17
Senior			
Highway & Airfield Pavement Design (TE 421).....	4		
Geometric Design of Highways (TE 422).....	4		
Structural Steel Design (TE 423).....		4	
Transportation Systems Planning (TE 433).....			4
Senior Project (TE 461, 462).....		2	2
Undergraduate Seminar (TE 463).....			2
Engineering Economy (IE 403).....		3	
Introduction to Air Pollution (EnvE 324).....			3
Thermodynamics (ME 302).....		3	
Advanced Materials Testing Lab (ME 349).....		1	
Electronics (EL 321).....	4		
The U.S. in World Affairs (Hist 205).....	3		
Urban Sociology (Soc 313)			3
Electives	3	3	3
	18	16	17

** To be selected in accordance with the General Education requirement.

WELDING AND METALLURGICAL ENGINEERING DEPARTMENT

Department Head, Richard C. Wiley

Enrico P. Bongio
Richard C. Carlston
Harry H. Honegger

Thomas D. Kay
William A. Oliver

Glenn E. Seeber
Orien W. Simmons

The Welding and Metallurgical Engineering Department prepares students for employment as metallurgical engineers, and also provides service courses in welding and metallurgy to students in other departments of the college.

Students who graduate as metallurgical engineers are employed by private industry and government agencies to deal with problems of design and manufacture of metals and alloys, corrosion protection, nondestructive testing, application of materials to specific needs and requirements including process development. Typical position titles are metallurgist, metallographer, materials engineer, welding engineer, nondestructive test engineer, and inspection and quality control specialist.

The curriculum offers opportunity to pursue specialized metallurgical areas on an elective basis in the senior year.

The Welding and Metallurgical Engineering Department is well equipped with various laboratories and shops. The welding shop facilities include general arc and oxyacetylene equipment, as well as production prototypes for the automatic and inert-gas shielded welding processes.

There are two metallurgical engineering laboratories for student use. The metallography laboratory is equipped with the latest instruments for study of internal structures of metals and alloys. The metallurgy laboratory includes equipment for vacuum melting and processing, heat treatment, nondestructive testing, air melting furnaces, a "wet" laboratory, and a physical testing laboratory.

The department sponsors a combined student chapter of two national societies, the American Welding Society and the American Society for Metals. The chapter offers an active program of professional and social activity.

CURRICULUM IN METALLURGICAL ENGINEERING

Freshman	F	W	S
Introduction to Metallurgy (WM 121).....		3	
Manufacturing Processes (WM 144).....		2	
* Manufacturing Processes	1		1
Engineering Communication (ET 153).....			1
General Physics (Phys 131, 132)		4	4
Analytic Geometry and Calculus (Math 141, 142, 143)	4	4	4
Freshman Composition (Eng 104, 105)	3	3	
General Psychology (Psy 202)			3
§ Life Science	3		
Health Education (PE 107)	2		
Physical Education Activity (PE 141).....		½	½
§ Literature			3
Electives	3		
	16½	16½	16½

* Selected from MP 141, 142, 143; IE 141.

§ To be selected in accordance with the General Education requirement.

Welding and Metallurgical Engineering

Sophomore	F	W	S
Materials Engineering (WM 306).....		3	
Materials Engineering Laboratory (WM 341).....		1	
Physical Metallurgy (WM 222).....			4
Digital Computer Applications (Engr 251)			2
Engineering Mechanics (ME 211, 212)	3	4	
General Chemistry (Chem 124, 125, 126)	4	4	4
General Physics (Phys 133).....	4		
Analytic Geometry and Calculus (Math 241).....		4	
Differential Equations (Math 242)			4
§ Literature or Philosophy.....	3		
American Government (Pol Sc 201).....	3		
Survey of Economics (Ec 201)			3
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	<u>17½</u>	<u>16½</u>	<u>17½</u>
Junior			
Theory of Materials (WM 301, 302, 303)	4	4	4
Metallurgical Engineering (WM 324, 325, 326)	3	3	3
Mathematics of Statistics (Stat 321, 322)	3		3
Strength of Materials (Aero 207)		5	
Strength of Materials Laboratory (Aero 229).....		1	
Physical Chemistry (Chem 305, 306)		3	3
Growth of American Democracy (Hist 204).....	3		
U.S. in World Affairs (Hist 205).....			3
§ Humanities	3		
Electives	1	2	1
	<u>17</u>	<u>18</u>	<u>17</u>
Senior			
Advanced Theory of Materials (WM 421, 422, 423).....	4	4	4
Applied Metallurgical Engineering (WM 424, 425, 426)	4	4	4
Senior Project (WM 461, 462)	2	2	
Undergraduate Seminar (WM 463)			2
Electric Circuit Theory (EE 201)	4		
Electronics (EL 321)		4	
Instrumentation and Control Systems (EL 322)			4
Thermodynamics (ME 302)		3	
Human Values in Engineering (Hum 402).....	3		
Electives			3
	<u>17</u>	<u>17</u>	<u>17</u>

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Welding and Metallurgical Engineering and other subjects.

§ To be selected in accordance with the General Education requirement.

SCHOOL OF HUMAN DEVELOPMENT AND EDUCATION



SCHOOL OF HUMAN DEVELOPMENT AND EDUCATION

Carl C. Cummins, Dean

The School of Human Development and Education provides a number of services and functions within the total college framework.

Included in the range of offerings in the school are programs leading to degrees in Child Development (B.S.), Education (M.A.), Home Economics (B.S., M.S.), and Physical Education (B.S., M.S.).

The School, through the Education Department, assists in the coordination of a campus-wide teacher education program and prepares individuals who are seeking credentials. The College is accredited to recommend for the Standard Teaching Credential with a specialization in Elementary Teaching, the Standard Teaching Credential with a Specialization in Secondary Teaching, the Standard Designated Services Credential with a specialization in pupil personnel services in the area of counseling, and the Standard Supervision Credential with specialization in elementary supervision, secondary supervision, elementary principalship, and secondary principalship.

In addition to the courses offered as a part of the major curricula, the School of Human Development and Education also provides physical education and psychology courses for general education in all curricula. This service function includes providing courses related to and directly supporting the area of the major in all other Schools.

The College has long supported a co-curricular program, and to this end the School of Human Development and Education provides valuable experience in intramural sports activities. Specialized co-curricular activities include: California Association for Health, Physical Education and Recreation, Student California Teachers Association, Phi Upsilon Omicron (Home Economics), and others.



CHILD DEVELOPMENT DEPARTMENT

Acting Department Head, Robert A. Christenson

Winifred Reynolds

Suzanne L. Violin

Josephine Stearns

Angli Wai

The interdisciplinary program in Child Development is designed to prepare persons interested in becoming specialists, teachers, and administrators for nursery schools and children's centers. In addition to providing actual experience in the guidance of children, this program provides the graduate with the knowledge and experience leading to a professional career in a variety of family service and child development programs.

The curriculum provides course work in anthropology, psychology, sociology, art, music, child development, and in the principles of program planning and administration. A nursery school laboratory on the campus and day care centers and nursery schools in the community provide students the opportunity to work with children.

The following table illustrates the distribution of units in the curriculum. The entire program totals 198 quarter units including elective units which vary depending upon the student's objective.

Child Development	44
Literature, Art and Music	17
Psychology, Sociology and Anthropology	30
Basic Subjects	67
Electives and courses to complete major	39

CURRICULUM IN CHILD DEVELOPMENT

Freshman	F	W	S
The Beginning Family (CD 103)			3
The Child, Family, and Community (CD 108)			3
Orientation to Art Materials (Art 232)		3	
Orientation to Crafts (Art 233)			3
Music Theory (Mu 101)	3		
Freshman Composition (Eng 104, 105, 106)	3	3	3
Introduction to Sociology (Soc 105)		3	
General Inorganic Chemistry (Chem 121, 122)		4	4
Health Education (PE 107)	2		
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Mathematics for General Education (Math 100)	3		
Electives	4	3	
	<hr/> 15½	<hr/> 16½	<hr/> 16½

Child Development

Sophomore	F	W	S
Nutrition (HE 210).....		3	
Family and Community Health (CD 222).....	2		
Child Development—Infancy (CD 232).....		3	
Child Development—Preschool Years (CD 233).....			3
Children's Literature (Eng 205).....			3
Basic Music (Mu 201).....	3		
Cultural Anthropology (Ant 201).....	3		
Organic Chemistry (Chem 226).....	4		
General Psychology (Psy 202).....		3	
Survey of Economics (Ec 201).....			3
Public Speaking (Sp 201).....			2
General Zoology (Zoo 131).....		4	
Natural History (Bio 127, 128, 129).....	3	3	3
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives.....	1		3
	<hr/> 16½	<hr/> 16½	<hr/> 17½
Junior			
American Government (Pol Sc 201).....	3		
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 205).....			3
Social Problems (Soc 303).....		3	
Social Stratification (Soc 323).....			3
Personality and Mental Health (Psy 301).....	3		
Genetics (Bio 303).....			3
Human Growth and Development (Ed 304).....		3	
Nursery School Programming (CD 319).....	3		
Nursery School Participation (CD 320).....	3		
Parent Education (CD 313).....			3
Maternal and Child Nutrition (HE 310).....		3	
Basic Structure and Concepts of Mathematics (Math 327, 328).....		3	3
Electives.....	4	2	1
	<hr/> 16	<hr/> 17	<hr/> 16
Senior			
* Literature.....		3	
* Philosophy.....	3		
Urban Sociology (Soc 313).....		3	
Psychological Testing (Psy 432).....			3
Administration of Child Development Programs (CD 404).....	3		
Supervised Nursery School and Community Experiences (CD 403).....		6	
Family Development (CD 405).....			3
Social Psychology (Psy 401).....	3		
Senior Project (CD 461, 462).....	2	2	
Undergraduate Seminar (CD 463).....			2
Electives.....	6	3	8
	<hr/> 17	<hr/> 17	<hr/> 16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Child Development, Home Economics and other subjects.

* To be selected in accordance with the General Education requirement.

EDUCATION DEPARTMENT

Department Head, Walter P. Schroeder

William W. Armentrout
Stanley B. Brown
Marjorie Cass
Ralph C. Collins
John E. Connely
Erland G. Dettloff
Robert W. Dickinson

Edward J. Ernatt
Homer E. Hoyt
Jack B. Jones
Richard V. Jones
James A. Langford
Robert L. Levison
Phillip T. McClung

Louis D. Pippin
Alice E. Roberts
Harry H. Scales
Bernard A. Troy
J. Barron Wiley
Irwin A. Willson
Malcolm W. Wilson

The Education Department staff, in addition to teaching professional courses, advises fifth-year and graduate students who are working toward initial and advanced credentials. All undergraduate students preparing to teach in the elementary or secondary schools may earn a baccalaureate major in: Agriculture, Biological Science, Chemistry, English, Home Economics, Mathematics, Physical Education, Physics, Social Sciences, or Industrial Arts. Credential candidates must also earn a minor which should be selected as early as possible. The details of the requirements are available from the major department, the minor department, or the Education Department.

The Education Department offers the Masters' Degree in Education; professional courses in Elementary School Teaching, Secondary School Teaching, School Supervision (including elementary and secondary principalships), and Pupil Personnel Services.

Special emphasis is placed on the preparation of persons to teach vocational subjects in the schools including advisement for the Bachelor of Vocational Education Degree. Instruction is also given in some administrative and supervisory phases of vocational education.

Instructors in many departments at California State Polytechnic College help students develop competence in the subject to be taught and the methods of teaching. Each candidate for teaching is prepared to be a professional staff member in a public school. An institutional approach to teacher education is strengthened through the Coordinating Committee for Teacher Education composed of staff members in the major, minor and the education departments which provides over-all planning and direction for the teacher education program. Good relationships with community and school personnel enable teaching candidates to engage in a variety of experiences needed to become successful instructors.

The Education Department provides coordination for the following teacher credential programs which are accredited by the State Board of Education.

Standard Teaching Credential—Elementary Specialization

Standard Teaching Credential—Secondary Specialization

Standard Designated Services Credential—Counseling

Standard Supervision Credential—Supervision and Principalship

CURRICULUM FOR THE MASTER OF ARTS DEGREE IN EDUCATION

Candidates may, on advisement, pursue programs leading to several concentrations designed to meet the specialized needs of individual students.

The concentrations available are Physical Sciences and Social Sciences. There are three concentrations in Education: Curriculum and Instruction, Counseling and Guidance, and School Supervision. All programs require 45 quarter units of acceptable graduate work with a minimum of 24 units of 500 series courses.

Programs with concentrations in the student's teaching major (Physical Sciences or Social Sciences) must include a minimum of 18 units of acceptable course work in the subject field of concentration (12 units of which must be in 500 series courses), and a minimum of 12 units of 500 series course work in Education.

Programs with a concentration in Curriculum and Instruction, Counseling and Guidance, or School Supervision must include a minimum of 18 units of 500 series course work in Education, and a minimum of 12 units of course work acceptable for graduate credit outside the field of education. The total program must include a minimum of 24 units of 500 series courses. See *Graduate Study Bulletin* for further details.

See **COURSES OF INSTRUCTION** section of this catalog for descriptions of courses in Education, Audiovisual Education and other subjects.

ETHNIC STUDIES DEPARTMENT

(Interdisciplinary Course Offerings)

Department Head, David J. Sanchez

The College presently offers in several departments a number of courses which are classified as ethnic studies designed to facilitate the study of various cultures and subcultures, their origins, development, contributions, and changing characteristics. The underlying premise is that in studying the society and culture of a people, a combination of several disciplines can be utilized to produce comparative insights and a more comprehensive knowledge. Although a major is not offered in ethnic studies, a proper selection of courses from this area may provide a student with an interdisciplinary minor, acceptable in some programs. The courses can be used to supplement the requirements for many degree programs, and some will satisfy the general education-breadth requirement.

The following courses are typical of those available in ethnic studies and students are referred to the current class schedule for cultures or areas to be emphasized within the courses in a given quarter.

Anthropology

Ant 201 Cultural Anthropology (3)

Art

Art 314 American Art (2)

Art 316 Non-Western Art (2)

Child Development

CD 301 Afro-American Pre-School Child (3)

CD 302 Mexican-American Pre-School Child (3)

Economics

Ec 300 Economic Problems (3)

Ec 325 Underdevelopment and Economic Growth (3)

Education

Ed 521 Teaching the Culturally Different Child (3)

English

Eng 214 Afro-American Literature (3)

Eng 215 Mexican-American Literature (3)

Eng 414 Significant World Writers (3)

Eng 418 Significant American Writers (3)

Foreign Language and Linguistics

Lang 101, 102, 103 Foreign Language—Independent Study (3) (3) (3)

Lang 124, 125, 126 English Composition for Foreign Students (3) (3) (3)

Lang 504 Problems in Language (3)

Lang 522 Teaching English as a Second Language (3)

(See course listing for specific languages)

Geography

Geog 201, 202, 203 Regional World Geography (3) (3) (3)

Geog 401 Area Geography (3)

History

- Hist 112 History of California (3)
- Hist 307, 308, 309 Latin American History (3)
- Hist 331 Afro-American History (3)
- Hist 341 Mexican History (3)
- Hist 381, 382 African History (3)
- Hist 411, 412, 413 History of East Asia (3) (3) (3)

Philosophy

- Phil 302 World Religions (3)

Physical Education

- PE 141 Physical Education Activity (Social folk dance) (½)

Political Science

- Pol Sc 311 Inter-American Relations (3)
- Pol Sc 402 Politics and Governments of Developing Areas (3)
- Pol Sc 465 Contemporary Problems and Institutions of the Middle East and Africa (3)
- Pol Sc 468 Contemporary Problems and Institutions of Africa South of the Sahara (3)

Sociology

- Soc 303 Social Problems (3)
- Soc 313 Urban Sociology (3)
- Soc 315 Race Relations (3)
- Soc 316 American Minorities (3)
- Soc 323 Social Stratification (3)
- Soc 344 Sociology of Poverty (3)

Music

- Mu 208 Ethnic Music of the World (3)



HOME ECONOMICS DEPARTMENT

Department Head, Ruth J. O'Reilly

Roseann Bishop
Connie Breazeale
Sarah E. Burroughs
Helen S. Crabtree
Kathleen D. Friend
Karen P. Goebel

Sarah A. Hardeman
Lezlie A. Labhard
Karen S. McDougal
Krishnakumar S. Morey
Cheryl Power
Mildred E. Roske

Patricia Saam
Ellen T. Stookey
Gretchen C. Streichert
Barbara P. Weber

The principal objectives of the Home Economics Department are to provide educational preparation for: (1) teachers of home economics in the secondary schools, (2) managers and dietitians in food service programs. In addition, persons with a more general interest in home economics will find the curriculum prepares for other occupational pursuits as well as provides a sound basis for successful family and personal life. Students are invited to consult with the department concerning their special interests in the field of home economics.

In addition to providing general education courses, the curriculum places considerable emphasis upon applied courses during the first two years and provides other courses basic to the advanced work in the later years.

CURRICULAR OPTIONS

Home Economics Education

The student preparing to teach home economics will follow the course listing for this option and will, in addition, need to complete the requirements for a teaching minor, certain courses in professional education, and a fifth year including graduate work in the major field. The Standard Teaching Credential with Specialization in Secondary Teaching is granted upon successful completion of this program.

Students interested in a general home economics program should follow this option, omitting the additional requirements for the teaching credential. Proper choice of elective courses will provide preparation for numerous positions such as home service adviser for utility firms, home economic journalist, and specialist in extension service, clothing and textiles, consumer education, home furnishings, or child care programs.

Food Administration—Dietetics

The Food Administration—Dietetics option provides the educational background for management of institutional and commercial food service programs. Membership in the American Dietetic Association is available to graduates following a one-year internship. In their junior year students concentrate in therapeutic or administrative dietetics or in business administration.

CURRICULUM IN HOME ECONOMICS

Freshman	F	W	S
Orientation to Home Economics (HE 101)	1		
The Beginning Family (CD 103)			3
Introduction to Foods (HE 121)	5		
Design Analysis for Home Economics (HE 122)		2	
Freshman Composition (Eng 104, 105, 106)	3	3	3
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Mathematics (Math 100, 113, 200, or Stat 211)	3		
* Art	3		
Health Education (PE 107)			2
Introduction to Sociology (Soc 105)			3
General Inorganic Chemistry (Chem 121, 122)		4	4
Electives and courses to complete major	2	8	2
	17½	17½	17½

* To be selected in accordance with the General Education requirement.

Home Economics

Sophomore	F	W	S
Personal and Home Management (HE 203)			3
Nutrition (HE 210)		3	
Child Development—Infancy (CD 232)		3	
Child Development—Preschool Years (CD 233)			3
Cultural Anthropology (Ant 201)	3		
General Psychology (Psy 202)		3	
Organic Chemistry (Chem 226)	4		
General Bacteriology (Bact 221)		4	
Public Speaking (Sp 201)	2		
Physical Education Activity (PE 241)	½	½	½
Survey of Economics (Ec 201)	3		
General Zoology (Zoo 131)			4
Electives and courses to complete major	4	3	6
	16½	16½	16½
Junior			
Meal Management (HE 321)		3	
Dynamics of Clothing (HE 341)	3		
Advanced Nutrition (HE 328)		3	
* Literature			3
Personality and Mental Health (Psy 301)	3		
Electives and courses to complete major	11	11	14
	17	17	17
Senior			
Home Management (HE 424)			3
Senior Project (HE 461, 462)	2	2	
Undergraduate Seminar (HE 463)			2
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
* Philosophy	3		
Electives and courses to complete major	7	10	7
	15	15	15

HOME ECONOMICS EDUCATION OPTION

(Add Courses Below to Basic Curriculum)

Freshman		Junior	
HE 131 Clothing Construction	(5)	CD 319 Nursery School Activities	(2)
		CD 320 Nursery School Participa- tion	(3)
Sophomore		HE 322 Textiles	(3)
CD 222 Family and Community Health	(2)	HE 323 Housing for Contempora- ries	(3)
HE 231 Household Equipment	(3)		
HE 241 Pattern Construction Analysis	(3)		
HE 242 Interior Design	(3)	Senior	
		CD 405 Family Development	(3)

FOOD ADMINISTRATION—DIETETICS OPTION

(Add Courses Below to Basic Curriculum)

Freshman		Senior	
Actg 221-2 Principles of Account- ing	(8)	HE 425 Quantity Cookery	(3)
Bus 206 Purchasing	(3)	HE 426 Food Production and Management	(3)
Sophomore		HE 427 Equipment and Layout	(3)
Chem 328 Biochemistry	(4)	HE 429 Diet Therapy	(3)
		Bact 421 Food Microbiology	(4)

* To be selected in accordance with the General Education requirement.

Home Economics

CURRICULUM FOR THE MASTER OF SCIENCE DEGREE

(For College requirements see the *Graduate Study Bulletin*)

A. Required:		Units
HE 501 Management of Family Resources	3	
HE 525 Experimental Studies in Textiles	4	
HE 528 Experimental Studies in Foods	4	
CD 533 The Child in Contemporary Culture	4	
HE 580 Graduate Seminar	3	18
B. Select at least three of the following courses:		
HE 328 Advanced Nutrition	3	
CD 404 Administration of Child Development Programs	2	
CD 405 Family Development	3	
HE 410 Community Nutrition	3	
HE 415 Methods of Teaching Nutrition	3	
HE 426 Food Production Management	3	
HE 427 Equipment and Layout	3	
HE 429 Diet Therapy	3	
HE 433 Historic Costume	3	
HE 523 Time Studies in Home Management	3	
HE 532 Problems and Trends in Home Decoration	3	9
HE 582 Graduate Seminar in Nutrition	1	
C. Courses outside the Home Economics Department:		
Select from 400 and 500 series level and have Advisory Committee approval.		9
D. Thesis (HE 599) or additional coursework at the 500-level and comprehensive examination		
		9
Total Units		45

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Home Economics and other subjects.



PHYSICAL EDUCATION MEN'S DEPARTMENT

Department Head, Robert A. Mott

Richard A. Anderson	Richard R. Harper	Bobbie A. Lane
Andrew Brennan	Dwayne G. Head	Thomas J. Lee
Larry M. Bridges	Richard Heaton	James D. Sanderson
Victor A. Buccola	William R. Hicks	Stevan M. Simmons
F. Stuart Chestnut	Vaughan Hitchcock	Neale R. Stoner
Frank C. Egenhoff, Jr.	James J. Jensen	Clarence H. Ward
August E. Garrido	Edward J. Jorgensen	James L. Webb
David W. Grosz		Ernest J. Wheeler, Jr.
F. Sheldon Harden		

WOMEN'S DEPARTMENT

Department Head, Mary Lou White

Joanne F. Climie	Barbara Sevier
Melva Irvin	Mary L. Stallard
Evelyn I. Pellaton	Moon Ja Minn Suhr

The major function of the Physical Education Departments is to provide both required and elective courses in physical education and health to meet the general education needs of all students. To supplement this general education, the departments administer an extensive intramural sports program for all students of the college. A second function of the departments is to prepare both men and women as secondary teachers in the fields of physical education and health. It is possible to have a curricular concentration in the field of recreation. A total of 28 units with adviser's approval may be taken in this area.

Because of an ideal geographical location and outstanding physical education facilities, the college has become a center for workshops held by the health and physical education organizations of the State.

Extensive outdoor facilities include a number of turfed areas for physical education classes and intramural sports activities. A football stadium, regulation baseball diamond with permanent stands and quarter-mile track provide outstanding facilities for intercollegiate athletic teams. Basketball, volleyball, handball, shuffleboard, all-weather tennis courts and two competitive swimming pools are used for instruction and student recreation.

The Men's Physical Education Building provides excellent facilities for all phases of the total physical education and intercollegiate athletic program. The main gymnasium has a championship basketball court and three intramural basketball courts. It also has a wrestling room, weight training area and a gymnastic room.

The women's program is centered in Crandall Gym which has adequate facilities for basketball, volleyball, badminton, gymnastics. A dance studio, pool, and an adaptive physical education laboratory are located in this area. A new Women's Physical Education complex is in design and will be constructed west of the Men's Physical Education facility.

CURRICULUM IN PHYSICAL EDUCATION (MEN)

Freshman	F	W	S
Freshman Composition (Eng 104, 105, 106)	3	3	3
College Algebra (Math 114)	3		
Trigonometry for Agriculture (Math 115)		3	
Health Education (PE 107)			2
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Physical Education Activity (PE 142)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Community Recreation (PE 126)			3
General Physical Science (PSc 101, 102)		4	4
General Zoology (Zoo 131, 132)	4	4	
Introduction to Physical Education (PE 100)	2		
School and Community Health (PE 103)			2
Electives	3	1	1
	<hr/> 16	<hr/> 16	<hr/> 16

Physical Education

Sophomore	F	W	S
Elementary Probability & Statistics (Stat 211)	3		
Social sciences elective		3	
General Psychology (Psy 202)		3	
Techniques of Officiating (PE 232)			3
Public Speaking (Sp 201)			2
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Physical Education Activity (PE 242)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Human Anatomy (Zoo 337)	3		
Human Physiology (Zoo 338, 339)		3	3
History and Philosophy of Physical Ed (PE 201)	3		
Apparatus and Gymnastics (PE 255)		2	
Literature, Philosophy, Art	3	3	3
Safety and First Aid (PE 221)			2
Electives	3	1	3
	16	16	17
Junior			
Introduction to Dance (PE 334)		3	
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)	3		
Educational Psychology (Ed 312)		3	
Football Coaching Theory (PE 321)			2
Track-Field Coaching (PE 333)			2
Baseball Coaching (PE 323)	2		
Physiology of Exercise (PE 303)			3
Intramural Sports (PE 331)			3
Kinesiology (PE 302)		3	
Wrestling Theory (PE 327)		2	
Swimming and Water Sports (PE 311)	2		
Tests and Measurements (PE 319)	3		
Human Development (Ed 304)			3
Advanced Composition (Eng 300)		3	
Electives	3	3	4
	16	17	17
Senior			
Senior Project (PE 461, 462)	2	2	
U.S. in World Affairs (Hist 205)	3		
Basketball Theory (PE 422)		2	
Physical Education Activity (PE 440)	1	1	1
Organization and Administration of Health and Physical Education (PE 401)	3		
Athletic Training and Massage (PE 432)		2	
Adaptive Physical Education (PE 406)			3
Electives	8	10	13
	17	17	17

CURRICULUM IN PHYSICAL EDUCATION (WOMEN)

Freshman			
Freshman Composition (Eng 104, 105, 106)	3	3	3
Mathematics (Math 114, 115)	3	3	
Health Education (PE 107)			2
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Physical Education Activity (PE 142)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
General Physical Science (PSc 101, 102)		4	4
General Zoology (Zoo 131, 132)	4	4	
Introduction to Physical Education (PE 100)	2		
School and Community Health (PE 103)			2
Community Recreation (PE 126)			3
Electives	3	1	1
	16	16	16

	Physical Education		
	F	W	S
Sophomore			
Elementary Probability and Statistics (Stat 211)	3		
Social sciences elective		3	
General Psychology (Psy 202)		3	
Intramural Sports (PE 331)	3		
Public Speaking (Sp 201)			2
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Physical Education Activity (PE 242)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Human Anatomy (Zoo 337)	3		
Human Physiology (Zoo 338, 339)		3	3
History and Philosophy of Physical Education (PE 201)	3		
Apparatus and Gymnastics (PE 256)		2	
Literature, Philosophy, Art	3	3	3
Safety and First Aid (PE 221)			2
Electives	1	1	6
	17	16	17
Junior			
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)			3
Educational Psychology (Ed 312)		3	
Sports for Women (PE 324, 325, 326)	3	3	3
Physiology of Exercise (PE 303)			3
Kinesiology (PE 302)		3	
Advanced Composition (Eng 300)		3	
Techniques of Officiating (PE 329, 330)	1	1	
Tests and Measurements (PE 319)	3		
Human Development (Ed 304)			3
Introduction to Dance (PE 334)		3	
Electives	6	1	5
	16	17	17
Senior			
Senior Project (PE 461, 462)	2	2	
U.S. in World Affairs (Hist 205)	3		
Physical Education Activity (PE 440)	1	1	1
Organization and Administration of Health and Physical Education (PE 401)	3		
Athletic Training and Massage (PE 432)	2		
Adaptive Physical Education (PE 406)			3
Dance (PE 446, 447, 448)	2	2	2
Electives	4	11	11
	17	16	17

CURRICULUM FOR THE MASTER OF SCIENCE DEGREE

(For College requirements see the *Graduate Study Bulletin*)

	Units
Required graduate level courses in physical education	15
(PE 501, 502, 511, 513 and 521)	
Elective graduate level units in physical education	9
(Of these, six may be taken in PE 599, Thesis)	
A maximum of 21 units may be taken outside of the Physical Education Department in 300, 400, and 500 level courses. Of these, at least nine must be taken in 500 level courses	21
	45

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Physical Education and other subjects.

PSYCHOLOGY DEPARTMENT

Department Head, L. Robert Sorensen

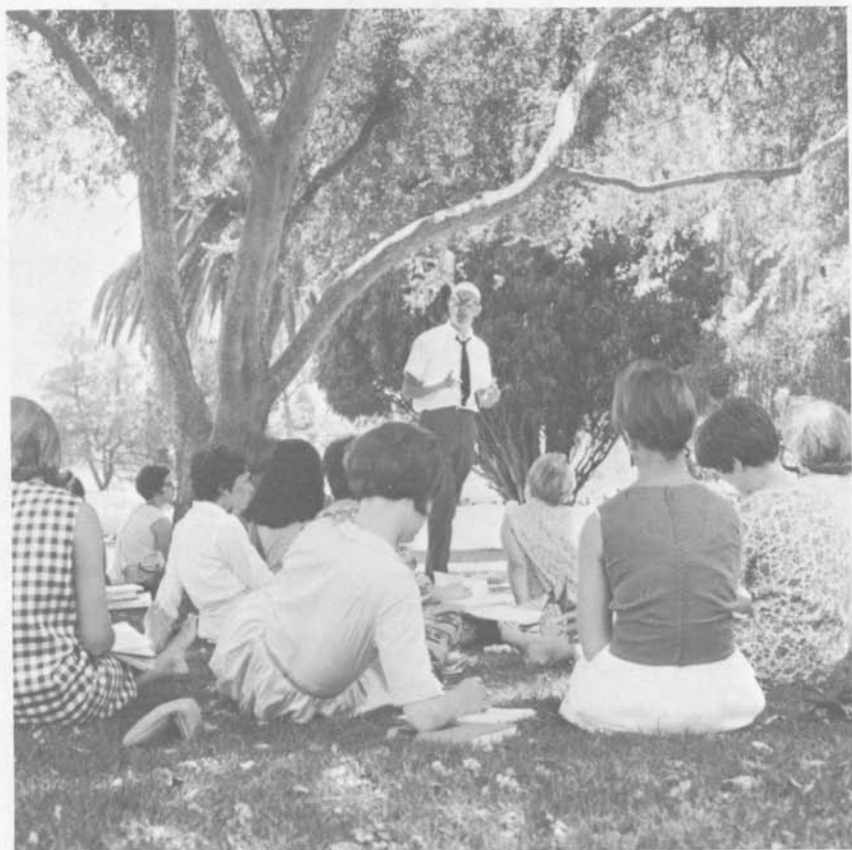
William D. Curtis
M. Dale Federer
Richard L. Greene

John E. Harrigan
Peter M. Litchfield

Linden L. Nelson
Peter Rabe

The Psychology program is designed to acquaint students with the facts, theories, and contemporary trends in psychology with the goal of effective application. The department faculty attempts to emphasize psychological applications to existing personal, social and technological problems wherever feasible and useful. Stress is placed upon individual student development of a more coherent and meaningful understanding of himself and of his interactions with others and with his environment.

The Psychology Department contributes to the overall college community through its participation in the general education program, as a source of electives for the various major areas, and as a resource for increased self-awareness and development.



SCHOOL OF SCIENCE AND MATHEMATICS



SCHOOL OF SCIENCE AND MATHEMATICS

Clyde P. Fisher, Dean
Vance D. Lewis, Associate Dean

The School of Science and Mathematics offers curricula leading to the Bachelor of Science degree in Biochemistry, Biological Sciences, Chemistry, Computer Science, Mathematics, and Physics. Graduate programs leading to the Master of Arts degree in Mathematics, Master of Science in Biological Sciences, and Master of Science in Applied Mathematics are also offered. The Reserve Officer Training Corps (ROTC) program is made available to all male students of the college through the Military Science Department.

Courses offered by the School of Science and Mathematics meet the needs of several groups of students:

1. Students working toward Bachelor of Science, Master of Arts, or Master of Science degrees with majors in science and mathematics.
2. Students from all majors who need to meet the requirements in General Education. These courses are required so that every graduate will be better prepared to be a participating citizen and a productive member of the State, nation, and world.
3. Students in Agriculture and Natural Resources, Architecture and Environmental Design, Business and Social Sciences, Communicative Arts and Humanities, Engineering and Technology, Human Development and Education, and Science and Mathematics who require competency in subjects which support, complement, or are closely related to their areas of specialization.
4. Students planning to become elementary, secondary, or junior college teachers, who need background in science and mathematics.

The School of Science and Mathematics and the School of Human Development and Education cooperate to recommend candidates for the California Standard Teaching Credential with majors in Biological Sciences, Chemistry, Mathematics, and Physics. Teaching minors are offered in Botany, Chemistry, Mathematics, Physics, and Zoology. Students may concentrate in Physical Sciences as a part of the requirements for the Master of Arts in Education degree.



BIOLOGICAL SCIENCES DEPARTMENT

Department Head, Richard F. Nelson

Frederick P. Andoli	Dennis F. Frey	Richard A. Pimentel
James P. Bacon, Jr.	R. C. Hatfield	Thomas L. Richards
Robert J. Brown	Dennis N. Homan	Ronald L. Ritschard
Tracey G. Call	C. Dennis Hynes	Robert J. Rodin
Fred L. Clogston	Eric V. Johnson	Aryan I. Roest
Alan F. Cooper	Richard J. Krejsa	Shirley R. Sparling
Gary K. Darland	George W. La Bar	William D. Stansfield
Douglas D. Donaldson	Kingston L. Leong	John W. Thomas
Richard K. Eppley	David H. Montgomery	David H. Thomson
Harry L. Fierstine	Glenn A. Noble	William Thurmond
Harry C. Finch	Pratapsinha C. Pendse	Dirk R. Walters

The department offers a complete undergraduate program leading to the Bachelor of Science degree. Students majoring in the department may concentrate interests in bacteriology, botany, entomology, zoology and other areas. Courses are offered to fulfill the biology requirements of other departments. For superior students a graduate program is offered leading to the Master of Science degree.

After earning a degree, students generally enter fields such as teaching, medical and biological laboratory technology, public health, wildlife management, agriculture, private, state and national park and forest services. A significant number of students also enter graduate or professional schools for advanced study of botany, entomology, microbiology, plant pathology, zoology, marine sciences, veterinary science, medicine, and dentistry.

Students are trained using modern facilities and instruments in a geographical area offering unusual opportunities for the study of a wide variety of plants and animals representative of both Northern and Southern California.

Courses designed for graduate students are numbered in the 500 series. Requirements for admission as a graduate student are given in the section on ADMISSIONS of this catalog. In addition, a candidate must provide test results of the Graduate Record Examination aptitude test and the advanced test in biology. Details of the curriculum for each student will be developed with his graduate committee and adviser.

In addition to the curricular concentrations listed below, the department offers the courses required for preprofessional training in medicine and the paramedical fields. In the teaching area, all the state requirements may be met for an academic major in biological sciences leading to credentials in secondary and in elementary teaching.

CURRICULAR CONCENTRATIONS

Applied Field Biology

This concentration is designed for students interested in wildlife management, fisheries, conservation, vertebrate pest control, and natural history.

Biology

The general biology program is designed for the student who wants the broadest possible training.

Botany

Plant structure, physiology, ecology, diseases and classification are the basis for courses leading to competency required for persons desiring positions as botanists.

Marine Biology

Students in this concentration may look forward to occupational and professional work in the rapidly expanding field of oceanographic studies and enterprises.

Medical Laboratory Technology

Concentration in this area prepares the student for his in-service training in a hospital.

Microbiology

This concentration is designed for students interested in bacterial and other microbiological aspects of food preservation, pollution or public health.

Biological Sciences

Plant Pathology and Entomology

Students are trained to recognize, evaluate and solve plant disease and insect problems. They may be employed as technicians in research or extension service, or may continue their studies at the graduate level.

Zoology

Invertebrate or vertebrate animals, terrestrial or aquatic species, macro or micro studies, form the basis of programs involved in the training of zoologists.

CURRICULUM IN BIOLOGICAL SCIENCES

Freshman	F	W	S
General Botany (Bot 121, 122, 123) or General Zoology	4	4	4
¹ General Inorganic Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226)			4
Freshman Composition (Eng 104, 105, 106)	3	3	3
² College Algebra and Trigonometry (Math 117)	5		
Health Education (PE 107)			2
Physical Education Activity (PE 141)	½	½	½
** Electives and courses to complete major		5	3
	16½	16½	16½
Sophomore			
General Zoology (Zoo 131, 132, 133) or General Botany	4	4	4
General Bacteriology (Bact 221)	4		
General Psychology (Psy 202)		3	
General Entomology (Ent 126)			4
College Physics (Phys 121, 122, 123)	4	4	4
Principles of Economics (Ec 201 or 211)	3		
* Social Sciences (except History)		3	
Physical Education Activity (PE 241)	½	½	½
** Electives and courses to complete major	1	2	4
	16½	16½	16½
Junior			
Ecology (Bio 325)	3		
Genetics (Bio 303)	3		
Advanced Composition (Eng 219 or 300)		3	
American Government (Pol Sc 201)	3		
* Literature or Philosophy	3	3	
* Humanities			3
Senior Project (Bio 461)			2
Biochemistry (Chem 328)		4	
Public Speaking (Sp 201)			2
** Electives and courses to complete major	5	7	10
	17	17	17
Senior			
General Physiology (Bio 431)	4		
Senior Project (Bio 462)		2	
Undergraduate Seminar (Bio 463)			2
General Cytology (Bio 423)			4
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
** Electives and courses to complete major	12	11	7
	16	16	16

* To be selected in accordance with the General Education requirement.

** Of the total elective units 18-29 shall be chosen in a field of concentration in the Biological Sciences with the approval of the adviser. At least 10 of these must be in 300 or 400 courses.

¹ Chem 124, 125 will substitute for Chem 121 and 122.

² Math 100-200, 102-103, or 113-114 will substitute.

CURRICULUM FOR THE MASTER OF SCIENCE DEGREE

(For college requirements see the *Graduate Study Bulletin*)

	Units
Courses in the general field of biological sciences	12
Selected from 300, 400 and 500 level courses. Three units each must be selected from courses having any four of the following prefixes: Bact, Bio, Bot, Cons, Ent, Zoo.	
Courses in the major field of interest	15
Selected from 300, 400 and 500 level courses in the Biological Sciences Department.	
Electives from 300, 400 and 500 level courses	6
Thesis (Bio 599) or additional course work with comprehensive examination	9
Seminar in Biology (Bio 590)	3
	<hr/> 45***

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Bacteriology, Biology, Botany, Conservation, Entomology, Zoology and other subjects.

*** At least 22½ of these units must be in 500 level courses, and all 45 units must be acceptable for graduate credit.



CHEMISTRY DEPARTMENT

Department Head, Bruce Kennelly

Philip S. Bailey	A. L. Houk	Howard D. Walker
Alan W. Cobb	Jerome F. Houlis	Harold J. Watson
Lee Charles Coombs	James Katekaru	Omer K. Whipple
Charles E. Dills	Martin Kellerman	Leslie A. Whitaker
Norman L. Eatough	Neil J. Moir	Hewitt G. Wight
Leland S. Endres	James M. Peters	David G. Williamson
Thomas G. Frey	Arthur L. Thomas	Max T. Wills
Lewis B. Hawley	Russell L. Tice	Marshall S. Wright

The Chemistry Department serves all schools of the College by providing scientific background. The department also contributes to the general education of all students by giving them a thorough foundation in the method and factual content of chemical science and the role it plays in society. The chemistry and biochemistry curricula lead to the bachelor of science degree.

Chemistry is the branch of science which deals with the composition and changes in composition of all substances. It is a description of the world at the atomic and molecular level. A science with a scope this broad offers many fields of specialization. Chemists analyze and synthesize such products as plastics, fibers, drugs, dyes and rocket fuels. The petroleum, textile, fertilizer, pharmaceutical, paint, paper and metal industries employ large numbers of chemists for quality control and development of new products. The occupational objectives of the curricula in chemistry are to qualify students for entry at the bachelor's level into positions in government service and industry and to help prepare teachers of the physical sciences. The curriculum in chemistry prepares the student to work at the bachelor's level as an organic, analytical, physical, or inorganic chemist. In addition, graduates have entered medical, dental, veterinary, pharmacy, medical technology, and graduate schools. Courses are taught in modern laboratories making use of the latest scientific instruments.

The Chemistry Department is fully approved and accredited by the American Chemical Society. Students who wish to be recommended for certification by the American Chemical Society must complete the equivalent of 6 quarter units in German or Russian (Lang 101 and 102, Foreign Language—Independent Study) and pass an examination demonstrating the ability to read scientific German or Russian. Use and application of German or Russian scientific literature is to be made in chemistry courses taken during the third and fourth year of the program and in the literature search for the Senior Project.

Graduate courses are offered which help to complete the requirements for the teaching credentials and for the master of arts degree in education with a concentration in the physical sciences.

Proper selection of electives in the curriculum in biochemistry permits specialization in nutritional, food, feed, pesticide, fertilizer or clinical chemistry. Students find employment in the laboratories of those companies devoted to the processing of food products and the production of agricultural and pharmaceutical chemicals. Positions for which the student may qualify include vitamin assay biochemist, food and drug chemist, meat technologist, fertilizer chemist, insecticide residue analyst and public health chemist.

It is recommended that the high school student planning to major in chemistry or biochemistry include at least two semesters of chemistry in his high school program. Students enrolling in General Chemistry or General Inorganic Chemistry are required to pass Chem 106, or the equivalent, or have the recommendation of their faculty adviser.

CURRICULUM IN CHEMISTRY

Freshman	F	W	S
General Chemistry (Chem 121, 122, 126).....	4	4	4
General Chemistry Laboratory (Chem 143).....			1
Freshman Composition (Eng 104, 105).....	3	3	
Oral or written communication.....			2
Analytic Geometry and Calculus (Math 141, 142, 143).....	4	4	4
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Health Education (PE 107).....			2
Biological Sciences (Bio 101, Bot 121, or Zoo 131).....	3		
Electives.....	2	5	3
	16 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$
Sophomore			
Quantitative Analysis (Chem 331).....	4		
Organic Chemistry (Chem 226).....		4	
* Approved Chemistry elective.....		4	3
General Physics (Phys 131, 132, 133).....	4	4	4
Analytic Geometry and Calculus (Math 241).....	4		
Mathematics (Math 242 or Stat 211 and CSc 101).....		4	
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
† Social Sciences elective (other than History).....			3
Electives.....	5		6
	17 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$
Junior			
Organic Chemistry (Chem 327, 338).....	5	5	
Physical Chemistry (Chem 305, 306).....		3	3
Physical Chemistry Laboratory (Chem 355, 356).....		1	1
* Approved Chemistry elective.....			4
Introduction to Optics and Atomic Physics (Phys 211).....			4
Literature.....	3		
American Government (Pol Sc 201).....	3		
† Social Sciences elective (other than History).....		3	3
Electives.....	5	5	2
	16	17	17
Senior			
Physical Chemistry (Chem 437).....	4		
Instrumental Analysis (Chem 439).....	4		
Senior Project (Chem 461, 462).....	2	2	
Inorganic Chemistry (Chem 402).....		3	
Undergraduate Seminar (Chem 463).....			2
* Approved Chemistry elective.....		3	4
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 205).....			3
Literature or Philosophy.....	3		
Humanities elective.....			3
Electives.....	3	5	4
	16	16	16

* To be chosen from: Chem 313, 328, 332, 342, 343, 400, 401, 403, 415, 416.

† To be selected in accordance with the General Education requirement.

Chemistry

CURRICULUM IN BIOCHEMISTRY

Freshman	F	W	S
General Chemistry (Chem 121, 122, 126)	4	4	4
Organic Chemistry (Chem 226)			4
Freshman Composition (Eng 104, 105)	3	3	
Oral or written communication			2
College Algebra and Trigonometry (Math 117)	5		
Analytic Geometry and Calculus (Math 141)		4	
Mathematics (Math 142 or Stat 211)			4
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Health Education (PE 107)			2
Life science (Zoo 131 or Bot 121 or Bact 221)	4		
Electives		4	
	<u>16½</u>	<u>15½</u>	<u>16½</u>
Sophomore			
Quantitative Analysis (Chem 331)	4		
Organic Chemistry (Chem 327)		5	
Approved Chemistry elective			3
Biochemistry (Chem 328, 329)		4	4
Physics (Phys 121, 122, 123 or 131, 132, 133)	4	4	4
General Psychology (Psy 202)	3		
Social Sciences elective (other than History)			3
Humanities elective	3		
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives	3	3	2
	<u>17½</u>	<u>16½</u>	<u>16½</u>
Junior			
Biophysical Chemistry (Chem 337)	4		
* Physical Chemistry (Chem 305, 306)		3	3
* Physical Chemistry Laboratory (Chem 355, 356)		1	1
Approved Chemistry elective	4		
American Government (Pol Sc 201)			3
Literature or Philosophy		3	
Electives	9	10	10
	<u>17</u>	<u>17</u>	<u>17</u>
Senior			
Approved Chemistry elective (300 or 400 level)		3	
Senior Project (Chem 461, 462)	2	2	
Undergraduate Seminar (Chem 463)			2
Literature or Philosophy	3		
Growth of American Democracy (Hist 204)	3		
U.S. in World Affairs (Hist 205)		3	
Social Sciences elective (other than History)			3
Electives	8	8	11
	<u>16</u>	<u>16</u>	<u>16</u>

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Chemistry and other subjects.

* Chem 335 and Chem 338 may be substituted.

COMPUTER SCIENCE AND STATISTICS DEPARTMENT

Department Head, Curtis F. Gerald

Emile E. Attala
William O. Buschman
Thomas V. Cahill
Robert H. Dourson
Bernard B. Evans
Kenneth G. Fuller

John E. Groves
Reino Hannula
John Y. S. Hsu
Elmo A. Keller
Y. Leon Maksoudian

John M. Rogers
Joseph B. Stefanac
Daniel F. Stubbs
Neil W. Webre
Sing-Chou Wu

The department offers a four-year program which leads to the bachelor of science degree in computer science, and also provides courses in computer technology and statistics to fulfill the needs of the college as a whole. Graduate level courses are offered in computer science and statistical fields.

Computer science courses offered by the department comprise those which deal with soft-ware, which includes programing languages and programing techniques to communicate with and effect the control of digital computers, and those which develop applications of computers to solve problems of scientific and business origins. Statistics courses include probability theory, applications of statistical procedures, and the mathematical models on which these statistical methods are based.

Graduates from the program in computer science are eagerly sought by the exciting and dynamic computer industry for positions as program analysts, systems engineers, applications programmers, and sales representatives. The curriculum has been designed to give them the ability to solve problems of wide variety through efficient utilization of modern computer concepts. Access to modern computing equipment is afforded through the college's computer center, which handles both educational and administrative applications. The statistics program prepares students for positions in industry and for graduate work in statistics. The department maintains for student use a calculating machine laboratory equipped with modern electrical and electronic calculators.

A student chapter of the Association for Computing Machinery is sponsored by the department. This active student organization supplements the department's activities in supplying vital contact with expert professional personnel from business and industry.

CURRICULUM IN COMPUTER SCIENCE

Freshman	F	W	S
Fortran Programming (CSc 101).....	1		
Boolean Algebra (CSc 218)		3	
Analytic Geometry and Calculus (Math 141, 142, 143).....	4	4	4
General Physics (Phys 131, 132)		4	4
Freshman composition (Eng 104, 105)	3	3	
Freshman composition (Eng 106) or Technical Writing (Eng 219)			3
* Biological Sciences	3		
Health Education (PE 107).....	2		
Physical Education Activity (PE 141).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives	3	2	5
	<u>16$\frac{1}{2}$</u>	<u>16$\frac{1}{2}$</u>	<u>16$\frac{1}{2}$</u>
Sophomore			
Linear Programming (CSc 219).....		3	
Computer Principles and Programming (CSc 221).....	3		
Digital Computer Symbolic Programming (CSc 222).....		3	
Digital Computer Programming (CSc 304).....			3
Programming Language/One (CSc 310).....			3
Numerical Linear Analysis (CSc 331).....	3		
Analytical Geometry and Calculus (Math 241).....	4		
Differential Equations (Math 242).....		4	
General Physics (Phys 133).....	4		
Principle of Economics (Ec 211, 212).....		3	3
* Literature			3
Basic Accounting (Actg 131, 132).....		3	3
Physical Education Activity (PE 241).....	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives	2		1
	<u>16$\frac{1}{2}$</u>	<u>16$\frac{1}{2}$</u>	<u>16$\frac{1}{2}$</u>

* To be selected in accordance with General Education requirement.

Computer Science

Junior

	F	W	S
Advanced Fortran Programming (CSc 301).....	2		
Introduction to Numerical Methods (CSc 332).....		3	
Numerical Analysis (CSc 333).....			3
Data Structures (CSc 345).....	3		
Systems Analysis (CSc 350).....		3	
Algorithmic Compilers (CSc 351).....			3
Mathematics of Statistics (Stat 321, 322, 323).....	3	3	3
* Literature or Philosophy.....	3		
American Government (Pol Sc 201).....		3	
General Psychology (Psy 202).....	3		
Managerial Accounting (Actg 301).....			4
Analog Computer Techniques (EL 313).....		3	
Principles of Digital Computers (EL 404).....	3		
Electives		2	3
	17	17	16

Senior

Mathematical Programming (CSc 419).....		3	
Programming Languages (CSc 451).....	3		
Computer Programming Systems (CSc 452).....	3		
Multi-Programming Systems (CSc 453).....		3	
Computer Graphics (CSc 455).....			3
Senior Project (CSc 461, 462).....	2	2	
Undergraduate Seminar (CSc 463).....			2
Growth of American Democracy (Hist 204).....		3	
U.S. in World Affairs (Hist 205).....			3
Statistical Quality Control (IE 336).....			3
General Chemistry (Chem 124).....		4	
* Philosophy	3		
Electives	5	2	5
	16	17	16

* To be selected in accordance with the General Education requirement.



MATHEMATICS DEPARTMENT

Department Head, Milo E. Whitson

Sabah Al-hadad	Thomas E. Hale	George H. McMeen
Olive M. Andersen	Charles J. Hanks	Allen D. Miller
Tomas Austbo	Charles T. Haskell	Peter L. Quinn
John H. Avila	Gilbert L. Homfeld	O. C. Ramsey
Alfred M. Bachman	Kempton L. Huehn	Chester H. Scott
Bernard W. Banks	Rex L. Hutton	Oliver T. Snodgrass
Robert O. Butler	Boyd Walker Johnson	Howard Steinberg
Charles D. Curtis	W. Boyd Judd	Henry B. Strickmeier
James E. Delany	Martin T. Lang	Neal R. Townsend
Charles A. Elston	Paul S. Lansman	Ralph M. Warten
Gary M. Epstein	George C. Laumann	Stephen T. Weinstein
Oswald J. Falkenstern	George M. Lewis	Patrick O. Wheatley
Gerald P. Farrell	John J. Lowry	Frederick G. Wild
Volmar A. Folsom	George R. Mach	Arthur D. Wirshup
D. Edward Glassco	Carolyn M. Magness	John A. Woodworth
Stuart Goldenberg	John H. Manning	Dennis G. Zill

The Mathematics Department offers a complete program of college work leading to a bachelor of science degree in mathematics with options in applied mathematics, computer science, statistics, and mathematics teaching. The department also offers mathematics courses needed in all other curricula for developing vocational and professional proficiency and for general education. The occupational flavor generated by these close interdepartmental relations increases both the usefulness of and the demand for the graduates who complete one of the degrees in mathematical sciences.

High school students planning a mathematics major should have at least three, preferably four, years of high school mathematics, and two years of science. Scores from the College Entrance Examination Board Scholastic Aptitude Test are used to determine the students' relative facility and competence in mathematics.

A program of study which leads to a Master of Science degree in Applied Mathematics is offered. A graduate of this program will be qualified for advanced positions in industry, business, civil service, college teaching, or other scientific endeavors. A Master of Arts degree in Mathematics is offered to further the preparation of students who may be working for a junior college or a secondary teaching credential.

CURRICULUM IN MATHEMATICS

Curricular Options

Applied Mathematics

The Applied Mathematics Option emphasizes preparation for industrial and civil service employment.

Computer Sciences

The Computer Sciences Option provides a significant core of theoretical and practical courses for occupational and professional competence in this new field.

Mathematics Teaching

The Mathematics Teaching Option provides the undergraduate basis in the preparation of the student for teaching at the secondary level.

Statistics

The Statistics Option provides a specialization in the applications of statistics for wide industrial or business use as well as for many governmental agencies.

Mathematics

Freshman	F	W	S
Analytic Geometry and Calculus (Math 141, 142, 143)	4	4	4
Fortran Programming (CSc 101)	1		
** Physics (Phys 131, 132)		4	4
Freshman Composition (Eng 104, 105, 106)	3	3	3
Health Education (PE 107)	2		
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives and courses to complete major	6	5	5
	16 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$
Sophomore			
Analytic Geometry and Calculus (Math 241)	4		
Computer Principles and Programming (CSc 221)			3
Differential Equations (Math 242)		4	
Mathematics of Statistics (Stat 321)			3
Mathematics of Matrices (Math 204)	3		
** Physics (Phys 133)	4		
Economics (Ec 201 or 211)		3	
* Social Sciences (except History)			3
* Oral and written expression			2
General Psychology (Psy 202)		3	
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Electives and courses to complete major	5	6	5
	16 $\frac{1}{2}$	16 $\frac{1}{2}$	16 $\frac{1}{2}$
Junior			
* Literature or Philosophy	3	3	
* Biological Sciences			3
* Natural Sciences (except Physics)	4	3	
American Government (Pol Sc 201)		3	
Growth of American Democracy (Hist 204)			3
Electives and courses to complete major	10	8	11
	17	17	17
Senior			
Senior Project (Math 461, 462)	2	2	
Undergraduate Seminar (Math 463)			2
* Literature	3		
U.S. in World Affairs (Hist 205)	3		
Electives and courses to complete major	8	14	14
	16	16	16

APPLIED MATHEMATICS OPTION (ADD COURSES BELOW TO MATHEMATICS CURRICULUM)

Junior and Senior Years

Math 312 Linear Algebra	(3)	Math 404 Vector Analysis	(3)
Math 318 Advanced Engineering Mathematics	(4)	Math 408 Complex Variables	(3)
Math 319 Partial Differential Equations	(3)	Math 412 Advanced Calculus	(3)
CSc 332, Numerical Analysis	(3)	CSc 301 Advanced Fortran	(2)
Math 381 Modern Algebra	(3)	Math 413 Advanced Calculus	(3)

COMPUTER SCIENCE OPTION (ADD COURSES BELOW TO MATHEMATICS CURRICULUM)

Sophomore Year

CSc 218 Boolean Algebra	(3)	Math 318 Advanced Engineering Mathematics	(4)
CSc 304 Computer Programming	(3)		
CSc 340 Cobol Programming	(3)		

- * To be selected in accordance with the General Education requirement.
 ** Teaching option majors may substitute Phys 121, 122, 123.

Mathematics

Junior and Senior Years

CSc 301 Advanced Fortran.....	(2)	CSc 452 Computer Programming ..	(3)
CSc 351 Algorithmic Compilers	(3)	CSc 332, 333 Numerical Analysis..	(6)
CSc 451 Programming	(3)	Stat 322 Math of Statistics	(3)

MATHEMATICS TEACHING OPTION (ADD COURSES BELOW TO MATHEMATICS CURRICULUM)

Junior and Senior Years

Math 312 Linear Algebra	(3)	Math 444 Projective Geometry.....	(3)
Math 381, 382, 383 Modern Algebra	(9)	Math 441 Theory of Numbers	(3)
Math 402-3 Secondary School Math	(6)	Math 442 College Geometry	(3)
		Stat 322 Math of Statistics.....	(3)

STATISTICS OPTION (ADD COURSES BELOW TO MATHEMATICS CURRICULUM)

Junior and Senior Years

Stat 322-3 Math of Statistics	(6)	CSc 332 Numerical Methods.....	(3)
Stat 425-6 Probability Theory	(6)	Math 412 Advanced Calculus	(3)
Math 312 Linear Algebra	(3)	*Bio 303 Genetics	(3)
Math 318 Advanced Engineering Mathematics	(4)	CSc 301 Advanced Fortran.....	(2)
		IE 336 Quality Control	(3)

CURRICULUM FOR THE MASTER OF ARTS DEGREE

(For College requirements see the Graduate Study Bulletin)

	<i>Units</i>
I. Required:	
Math 509, 510, 521, 580	12
II. Select 12 units from the following:	
Math 505, 506, 507, 508, 580, 596.....	12
III. Select 12 units from any 300, 400, 500 courses having the prefixes, Math, CSc, Stat approved by the M.A. Mathematics Committee	12
IV. Elect 9 additional units with approval of adviser	9
V. Satisfactorily complete a terminal written and oral examination; or complete Math. 596, Graduate Thesis, for 6 units credit under II.	
Total units	45

CURRICULUM FOR THE MASTER OF SCIENCE DEGREE IN MATHEMATICS (APPLIED)

(For College requirements see the Graduate Study Bulletin)

	<i>Units</i>
I. Required: Math 512, 514, 593; CSc 531	12
II. Select four from the following courses: Math 513, 515, 516, 518; CSc 532, 533; Stat 527, 528	12
** III. Select with approval of adviser 9 units in one area other than mathematics, statistics, and computer science (physics, engineering, economics, chemistry, etc.)	9
IV. Electives with approval of advisory committee to be selected from mathematics, computer science, or statistics courses	12
Total units	45

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Computer Science, Mathematics, Statistics and Probability, and other subjects.

- * Satisfies Biological Sciences General Education course requirement.
 ** Candidates with an approved Bachelor's or higher degree in a field other than mathematics, computer science or statistics may substitute advisor approved 300 and 400 level Math, CSc or Stat. courses.

MILITARY SCIENCE DEPARTMENT

Department Head, Colonel William L. Hastie

Maj. Haspard R. Murphy
Lt. Col. George L. Silva
Lt. Col. Clifford F. Terry

Capt. William A. Todd III
Capt. Myrt W. Webb, Jr.

PURPOSE

The production of qualified, educated junior officers for the United States Army is a vital part of the National Defense effort. The Military Science Department conducts ROTC (Reserve Officer Training Corps) classroom and leadership laboratory instruction for students who desire to fulfill their military obligation as commissioned officers. Additionally, certain outstanding students are offered direct commissions in the U. S. Regular Army. As in any other academic courses, credits accrued for completing Military Science courses are awarded toward college graduation. It is permissible for students not enrolled in the ROTC program to enroll in particular Military Science classes for elective credit based on the determination that the student load is within the capability of the assigned instructor group. To be eligible for participation in ROTC, a student must be a regularly enrolled male student of this institution, have sufficient time remaining as a college student to permit completion of the advanced ROTC course prior to reaching his 28th birthday, and be physically qualified. Medical acceptability for the basic course requires a statement from the student's physician that the individual is medically fit to participate in the ROTC program, a program not more strenuous than a college physical education program. ROTC scholarships are available; see under SCHOLARSHIPS.

ROTC removes most uncertainties connected with the student's military obligation. Senior students are given the opportunity to request the month they desire to be called to active duty, the branch of the army in which they desire to be commissioned, and the general geographical area in which they desire to be stationed while performing their active duty.

EQUIPMENT AND UNIFORMS

All necessary ROTC equipment, uniforms and text books are furnished to the student by the United States government free of charge. Title to this property, other than expendable items, remains with the government. Upon entry into active duty after graduation, each commissioned student is granted a special \$300 uniform allowance to use for purchasing his own uniforms.

DRAFT DEFERMENT

Each regularly enrolled ROTC student may execute a deferment agreement with the United States government at the end of the first quarter of his freshman year. The agreement provides absolute draft deferment as long as the student remains enrolled in the ROTC program.

Graduating students who have completed the ROTC program and who apply to and are accepted by accredited institutions for graduate instruction, upon approval of the Department of the Army, are deferred from active duty to obtain a graduate degree.

FOUR YEAR PROGRAM

The four year elective ROTC program is a progressive course of instruction divided into a two year basic course and a two year advanced course.

Students with previous military service, or with Junior or Senior ROTC credit from another institution, may be granted advanced standing in the course. Students who will complete degree requirements in three academic years may enroll in freshman and sophomore ROTC courses concurrently and complete the four-year program in three years.

Army regulations permit a student to substitute related academic courses for one quarter of each of the last two years of the ROTC program. These academic courses are in place of the regular MSc winter quarter requirements during each of the junior and senior year sequences.

Four year program students are required to attend only one summer training camp for a six week period following completion of their junior year. The government furnishes all uniforms, equipment, room, board, and medical care for students at camp. Additionally, each student is paid \$240 and is provided a six-cents-per-mile transportation allowance from and to his home.

Students who elect to enter the advanced course of ROTC instruction are paid \$50 per month while they are enrolled in the advanced course. There is no obligation connected with the receipt of this subsistence allowance other than the willingness by the student to accept a reserve commission of Second Lieutenant if it is offered to him upon graduation and to serve a period of two years on active duty as a commissioned officer.

TWO YEAR PROGRAM

The opportunity offered by ROTC training is available in a special program to transfer students and to currently enrolled college students who were unable, for cogent reasons, to participate in the four year ROTC program.

To qualify for the two year program, the student must complete a special basic ROTC summer camp of six weeks duration. Those students currently enrolled at this college will complete the basic camp between their sophomore and junior years. Transfer students must complete the camp during the summer immediately prior to their matriculation at this college. It is important that potential transfer students who plan to participate in the two year ROTC program make their intentions known directly to the Head, Military Science Department, no later than 1 March of the year they plan to register at the college even though this date may precede the date of their final acceptance by the college.

The government will provide six-cents-per-mile transportation allowance to and from basic summer camp, and the rate of pay as an Army Private. All equipment, uniforms, room and board are furnished free while at camp. The basic summer camp is in addition to the advanced summer camp which must be taken at the end of the junior year as part of the advanced course. No college credit is given for the basic summer camp.

Upon successful completion of the basic summer camp, the student is admitted directly into the advanced ROTC course in September during his registration at the college. He is entitled then to the advanced course subsistence allowance and all other privileges of advanced course standing as enumerated above under the four year program.

FLIGHT INSTRUCTION PROGRAM

The Army ROTC Flight Instruction Program is offered to students in the second year of the advanced course. The student receives a basic introduction to the principles of flight in single engine, fixed-wing aircraft. The program is conducted as an extracurricular activity, without cost to the student. Each student receives 35 hours of ground instruction and 36½ hours of in-flight instruction.

The student must be enrolled in or have completed MS IV and must complete satisfactorily a physical examination and flight aptitude tests. Approval of the dean of the applicant's school and the Professor of Military Science is required.

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Military Science and other subjects.

PHYSICS DEPARTMENT

Department Head, Robert H. Frost

Lawrence H. Balthaser	David W. Hafemeister	David M. Roach
Joseph C. Boone	Robert E. Holmquist	Arthur Z. Rosen
Woodford E. Bowls	Ray J. Holt	Gordon A. Silver
Athol J. D. Brunk	Aernat S. James	Willem L. Van
Anthony J. Buffa	Herbert R. Kabat	Wyngaarden
William E. Clements	W. Reed Langford	Orvin E. Wagner
Clyde G. Deasel	Leon W. Magur	Leonard W. Wall
Walter E. Elliott	Kenneth S. Ozawa	Walter D. Wilson
Teymoor Gedayloo	Ralph A. Peters	Lloyd J. Work

The Physics Department serves all schools of the College by offering courses which help provide scientific explanations for work taken by students in their major fields. The department also contributes to the general education of all students by giving them a thorough foundation in the method and factual content of the physical sciences and the roles which they play in society. The physics curriculum leads to the bachelor of science degree.

The occupational objectives of the curriculum in physics are to qualify students for entry at the bachelor's level into positions in government service and industry and to help prepare teachers of the physical sciences. Graduates are engaged in the development and design of products associated with electronics, aircraft, guided missiles, satellites, atomic power, petroleum, paper, metals, textiles and plastics.

Graduate courses are offered which help to complete the requirements for the teaching credentials and for the master of arts degree in education with a concentration in the physical sciences.

It is suggested that the high school student planning to major in physics include in his high school program as much as possible of the following: six semesters of college preparatory mathematics, two of physics and two of chemistry.

CURRICULUM IN PHYSICS

Freshman	F	W	S
Biological Sciences (Bio 101, Bot 121, or Zoo 131)	3		
Freshman Composition (Eng 104, 105, 106)	3	3	3
Manufacturing Processes (MP 141, 142)	1	1	
Health Education (PE 107)			2
Physical Education Activity (PE 141)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Analytic Geometry and Calculus (Math 141, 142, 143)	4	4	4
General Chemistry (Chem 121, 122)	4	4	
Organic Chemistry (Chem 226)			4
General Physics (Phys 131, 132)		4	4
Introduction to Physics (Phys 100)	1		
	<u>$16\frac{1}{2}$</u>	<u>$16\frac{1}{2}$</u>	<u>$17\frac{1}{2}$</u>
Sophomore			
Economics (Ec 201 or 211)			3
Physical Education Activity (PE 241)	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Analytic Geometry and Calculus (Math 241)	4		
Differential Equations (Math 242)		4	
Fortran Programming (CSc 101)		1	
General Physics (Phys 133)	4		
Introduction to Optics and Atomic Physics (Phys 211)		4	
Introduction to Nuclear Physics (Phys 213)			3
Introductory Nuclear Physics Laboratory (Phys 243)			1
Electrical Circuits (Phys 206)		3	
Electrical Methods in Physics (Phys 207)			2
Electrical Measurements Laboratory (Phys 256, 257)		1	1
** General Education elective	3		
* Humanities	3		
Electives	3	3	6
	<u>$17\frac{1}{2}$</u>	<u>$16\frac{1}{2}$</u>	<u>$16\frac{1}{2}$</u>

* To be selected in accordance with the General Education requirement.

** Chosen from Astronomy, Geology, Biological Sciences, Social Sciences (other than History).

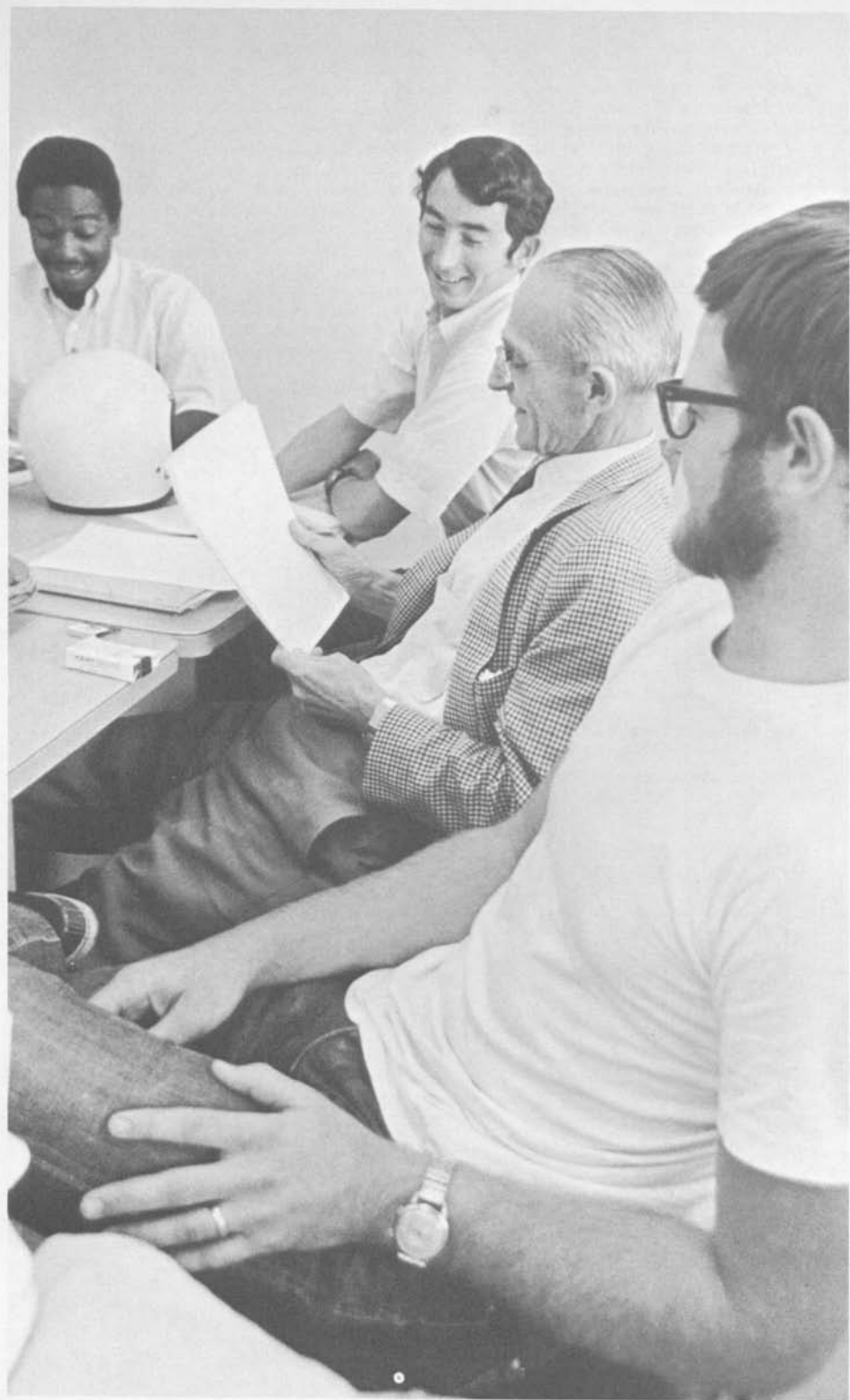
Physics

Junior	F	W	S
* Literature			3
Advanced Engineering Mathematics (Math 319)		3	
Advanced Analysis for Science (Math 304)	4		
Hear (Phys 301)	3		
Analytic Mechanics (Phys 302, 303)	3	3	
Solid State Physics (Phys 406)			3
Solid State Physics Laboratory (Phys 456)			1
Waves and Vibrations (Phys 212)			3
Quantum Mechanics (Phys 405)		3	
Atomic Physics (Phys 401)	3		
Atomic Physics Laboratory (Phys 441)	1		
Physical Optics (Phys 223)		4	
Electives	3	3	6
	17	16	16
Senior			
American Government (Pol Sc 201)	3		
Growth of American Democracy (Hist 204)		3	
U.S. in World Affairs (Hist 205)			3
* Social Sciences (other than History)	3		
* Literature or Philosophy		3	
Electricity and Magnetism (Phys 306, 307)	4	3	
Nuclear Physics (Phys 403)		3	
Nuclear Physics Laboratory (Phys 443)		1	
Quantum Mechanics (Phys 407)			3
Senior Project (Phys 461, 462)	2	2	
Undergraduate Seminar (Phys 463)			2
Electives	4	1	8
	16	16	16

See COURSES OF INSTRUCTION section of this catalog for descriptions of courses in Physics and Physical Science and other subjects.

* To be selected in accordance with the General Education requirement.





COURSES OF INSTRUCTION





ACCOUNTING

Actg 131, 132 Basic Accounting (3) (3)

A study of accounting to show how records are kept, their uses and limitations. For the student who needs a general knowledge of accounting. Not applicable for credit toward major in business administration. 2 lectures, 1 two-hour laboratory.

Actg 221, 222 Principles of Accounting (4) (4)

Principles and practices of fundamental accounting theory. 3 lectures, 1 two-hour laboratory.

Actg 223 Cost Accounting and Analysis (4)

Accounting for cost control applicable to production, distribution, and service enterprises. Analysis and interpretation of financial statements. 3 lectures, 1 two-hour laboratory. Prerequisite: Actg 132 or 222

Actg 301 Managerial Accounting (4)

Relationship of accounting to business. Analysis of accounting principles and procedures to needs of business. 4 lectures. Prerequisite: Actg 132 or 222

Actg 304, 305 Tax Accounting (3) (3)

Analysis of the federal and state tax laws and their application to taxpayers. Estate and other succession taxation, gift taxation, and income taxation of fiduciaries. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 222

Actg 321, 322, 323 Advanced Accounting (4) (4) (4)

Advanced accounting theory and practice including consolidated financial statements. Problems of valuation and income determination relating especially to cash, accounts receivable, inventories, and installment sales. 3 lectures, 1 two-hour laboratory. Prerequisite: Actg 222

Actg 331 Accounting Systems (3)

Installation and operation of accounting systems in business with special attention to internal control. Application of the latest techniques in the use of modern methods of handling numbers with special reference to accounting and statistical methods. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 223

Actg 332 Advanced Cost Accounting (4)

Process and standard costs; overhead costs, budgeting. Use of cost accounting data in economic analyses and managerial control. 3 lectures, 1 two-hour laboratory. Prerequisite: Actg 223

Actg 333 Accounting for Governmental and Non-Profit Organizations (2)

Accounting for governmental and non-profit organizations with emphasis on fund accounts. Budgetary and encumbrance procedures and special reporting requirements. 2 lectures. Prerequisite: Actg 132 or 222

Actg 346, 347 Auditing (3) (3)

Principles and procedures of the verification of accounts and the preparation of working papers and the completed audit report. 2 lectures, 1 two-hour laboratory. Prerequisite: Actg 323 or consent of instructor.

Actg 452, 453 C.P.A. Review (3) (3)

Intensive study of advanced accounting problems as found in C.P.A. examinations. Designed for those preparing for C.P.A. examination, and for those planning to enter field of private business accounting. 1 lecture, 2 two-hour laboratories. Prerequisite: Actg 323

AERONAUTICAL ENGINEERING

Aero 101 Aircraft and Missile Fundamentals (3)

Fundamentals of aircraft and missile systems. Field trips conducted to existing departmental laboratories permit students to operate, and to see in operation, equipment used by aeronautical engineers. Not for aeronautical engineering majors. 3 lectures.

Aero 121, 122, 123 Aerospace Fundamentals (2) (2) (2)

Introduction to the engineering profession including the aeronautical and aerospace fields. Engineering approach to problem-solving and analysis of data obtained from experiments. Basic nomenclature and design criteria used in the aerospace industry. Applications to basic problems in the field. 2 laboratories.

Aero 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Aero 202 Mechanics of Materials (5)

Stresses, strains, deflections due to axial, torsional, and flexural loading. Statically indeterminate members and columns. Dynamic and repeated loading. Emphasis on problem-solving. May not be substituted for Aero 207. 5 lectures. Prerequisite: ME 205 or equivalent.

Aero 207 Strength of Materials (5)

Stresses, strains, and their relations applied to axial, torsional, and flexural loads. Statically indeterminate axial members, beams, and shafts. Columns, dynamic loads, repeated loads. 5 lectures. Prerequisite: ME 211

Aero 229 Strength of Materials Laboratory (1)

Physical properties of engineering materials. Tension, compression, bending, shear, and torsion tests. Tests of riveted and bolted joints. Tests of long and short columns. Effect of heat treatment on material properties. Use of the SR-4 strain rosette for determining principal strains. Reporting of results in the form of written reports. 1 laboratory. Concurrent: Aero 207

Aero 240 Additional Engineering Laboratory (1-2)

Total credit limited to four units, with not more than two units in any one quarter. 1 or 2 laboratories.

Aero 252 Engineering Problems—Analog Computers (1)

Solution of selected engineering problems by means of analog computers. 1 laboratory. Prerequisite: Math 141

Aero 301, 302, 303 Aerothermodynamics (5)

Properties and characteristics of fluids, fluid statics and dynamics, the thermodynamic relations, the properties of subsonic and supersonic flow, both laminar and turbulent. 5 lectures, fall; 4 lectures, 1 laboratory, winter and spring. Prerequisite: ME 211, Math 318

Aero 306 Aerodynamics (5)

The standard atmosphere, compressible flow, airspeed measurements, types of fluid flow, airfoil theory, wing theory, lift, drag, expansion waves, normal and oblique shock waves, aircraft performance, stability and control. 5 lectures. Concurrent: Aero 303

Aero 322 Analog Computer Techniques (3)

The solution of typical problems and dynamics that an aeronautical engineer might encounter by use of analog computer techniques. 1 lecture, 2 laboratories. Prerequisite: Aero 252

Aero 324, 325 Stress Analysis (4) (4)

Analysis of airplane and missile structural components; combined stress and failure theories; column and sheet-stringer panel analysis. Shear-resistant and tension-field beams; single and multi-cell box beams; unsymmetrical and tapered beams. Bulkhead and cutout analysis; analysis of indeterminate structures. Laboratory tests of typical aircraft structural components. Experimental methods of stress analysis. 3 lectures, 1 laboratory. Prerequisite: Math 242, Aero 207

Aero 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

Aero 401, 402 Aircraft and Missile Propulsion Systems (4) (3)

Flightcraft power plant types, components, characteristics, and requirements. Principles of thrust and energy utilization. Thermodynamic processes and performance of turboprop, turbo jet, ramjet, and rocket engines. 401: 3 lectures, 1 laboratory. 402: 3 lectures. Prerequisite: Aero 303

Aero 403 Rocket Propulsion (3)

Classification of propulsion systems. Definitions of rocketry terms. Rocket history. Nozzle theory and thermodynamic relations. Rocket propellant performance calculations. Heat transfer in rocket thrust chambers. Liquid propellant rocket systems. Solid propellant rocket fundamentals. Design of solid propellant rockets. Flight performance. Rocket testing. 3 lectures. Prerequisite: Aero 402

Aero 404, 405 Gas Dynamics (3) (3)

Fundamental theory of one dimensional gas dynamics. Shock wave propagation, normal and oblique shocks, Rayleigh line flow, Fanno line flow, Prandtl-Meyer function, supersonic wind tunnel, and measurement methods. 3 lectures. Prerequisite: Aero 303

Aero 406 Introduction to Boundary-Layer Theory (3)

Concept of the boundary-layer. Boundary-layer equations, the similarity concept, fundamental similarity solutions, the thermal boundary-layer. 3 lectures. Prerequisite: Aero 303 or equivalent.

Aero 407 Aerospace Science (3)

History of aviation, rocketry, and space flights; fundamentals, descriptions of propulsion of flight vehicles, trajectories and orbital mechanics, aerodynamics, re-entry, pyrotechnics, nucleonics, electrical power for guidance, telecommunication; aerospace environment, flight vehicles, spacecraft, and sounding rockets. 3 lectures. Prerequisite: Junior standing.

Aero 408 Advanced Flightcraft Structural Analysis (3)

Indeterminate structures, frame analysis, treatment of plates and shells, shear lag and deformation, effect of skin cutouts, application of structural theory to the design of flightcraft components. 3 lectures. Prerequisite: Aero 325

Aero 409 Flight Testing (3)

Flight test instrumentation, obtaining of data and methods of data reduction for determining aircraft and engine performance, aircraft stability and control and structural integrity. Evaluation of hydraulic, electrical, communication, control, and air conditioning systems. Compliance with specifications. Severe environmental operation. 3 lectures. Prerequisite: Aero 303

Aero 411, 412, 413 Space Technology (3) (3) (3)

Motion of a body in the central force field. Space vehicle trajectories, guidance systems, power generators for interplanetary travel, structural loading, and principles of space vehicle design. 3 lectures. Prerequisite: Aero 303

Aero 415 Aerodynamics of Stability and Control (3)

Longitudinal stability and control. Static and dynamic stability, wing moments and balance. Factors influencing the stability of the complete airplane. Lateral and directional stability. Design and operation of control surfaces. Compressibility effects. 3 lectures. Prerequisite: Aero 303

Aeronautical Engineering/ABM

Aero 416 Unconventional Aircraft (3)

Introduction to analysis of rotary wing aircraft, VTOL, STOL, and lifting body vehicles. Types of flight control mechanism. Performance and stability of vehicles. 3 lectures. Prerequisite: Aero 303

Aero 417 Structural Dynamics (4)

Effect of shock and vibration loads on aircraft and missile structures. Thermal loading and other transient loads imposed by the vehicle mission. 4 lectures. Prerequisite: ME 316

Aero 419 Analysis of Aeronautical Systems (3)

Application of elementary systems analysis and operation analysis techniques to the project development phase of an aerospace vehicle or system. 3 lectures.

Aero 421 Flight Mechanics (3)

Analytical and graphical methods for the determination of flight characteristics of aircraft and aerospace vehicles. 1 lecture, 2 laboratories. Prerequisite: Aero 306

Aero 444, 445, 446 Missile and Aircraft Design Laboratory (4) (4) (4)

Preliminary layout of a typical transport aircraft and a space vehicle using design and calculation techniques developed in previous aeronautical engineering courses. Design of selected component structures and preparation of necessary drawings. 2 lectures, 2 laboratories.

Aero 457, 458 Aeronautical Engineering Laboratory (3) (3)

Use of laboratory instruments to develop the technique of obtaining engineering measurements, special assigned problems in the field of aeronautics. 1 lecture, 2 laboratories. Prerequisite: Aero 303

Aero 461, 462 Senior Project (2) (2)

Selection and completion of a project which is typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: Senior standing.

Aero 463 Undergraduate Seminar (2)

Studies and technical developments in the field of Aeronautical Engineering. 2 meetings. Prerequisite: Senior standing.

Aero 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

AGRICULTURAL BUSINESS MANAGEMENT

ABM 103 Agricultural Business Organization (3)

Development, types and forms of farm related businesses. Agricultural businesses considered from standpoint of primary functions, services and problems including such factors as business organization, records, information, location, production, business with banks, labor and government. Emphasis on California farm related industries. 3 lectures.

ABM 201 Agricultural Business Sales and Service (3)

Growth and opportunities in agricultural sales. Factors involved in developing sales program for the farm operation. Application of successful selling principles and practices in providing farm operators with agricultural materials, supplies, equipment and services. Consideration given to sales and service for farm related businesses and non-agricultural customers. Selling aspects involved in marketing of farm products by farm related businesses. 3 lectures.

ABM 202 Agricultural Cooperative Organization and Management (3)

Purpose, types and organization of cooperatives. Emphasis on California agricultural cooperatives, their characteristics, operation and problems. 2 lectures, 1 two-hour laboratory.

ABM 203 Agricultural Business Credit and Finance (3)

Investment, finance and credit requirements of agricultural businesses serving production, processing and distribution channels of agricultural products and services. Financial principles and credit management as applied to agricultural businesses; financial procedures and problems in establishing and managing the farm-related business. 3 lectures. Prerequisite: Actg 221 or consent of instructor.

ABM 211 Fair Management (3)

Principles and procedures in organizing, managing and promoting fairs. Emphasis on California and Western fairs. Career opportunities, programs and problems in fair management and growth of fairs in America. A two-day field trip is included to a county or district fair. 3 lectures.

ABM 230 General Agricultural Business Management (3)

Agricultural business growth, opportunities, functions and services, organization and operation. Emphasis on California agricultural businesses and industries. A general course for non-Agricultural Business Management majors. 3 lectures.

ABM 241 Agricultural Business Machines Practices (1)

Evolution, application, and costs of calculator type machines. Basic calculator procedures, practices, and techniques needed to work agriculturally related statistical problems. 1 activity.

ABM 301 Agricultural Business Management and Government Policy (3)

Agricultural business policy, objectives and formulation, resource allocation and production adjustments; government subsidies, acreage controls, storage, crop insurance, forward prices, consumer subsidies, economic, social and political influences. 3 lectures. Prerequisite: Ec 211

ABM 302 Agricultural Business Sales Management (3)

Organizing and coordinating agricultural machinery, crop, livestock, poultry, fertilizer, insecticide and other farm and farm related sales and service programs. Planning, policies, pricing, sales control records, training salesmen, advertising, supervising salesmen, and evaluating sales performance as related to needs and demands of farm and farm related agricultural businesses. 3 lectures. Prerequisite: ABM 201

ABM 303 Agriculture—Consumer Relationships (2)

Basic facts, public opinion and ways of developing greater understanding of agriculture, its nature, characteristics, problems and relationship to non-farm persons. Consumer education programs and procedures. 2 lectures.

ABM 305 Farm Group and Commodity Organizations (2)

Survey of farmers' efforts to study and seek solutions to individual and industry-wide problems through organized group effort. Major farm organizations, policies and services to members. 2 lectures.

ABM 306 Government Agricultural Service Agencies (2)

Programs and services performed by government agencies on behalf of farm and off-farm agricultural industries. Designed for students who may use services of, who may advise others of such services, or who may seek a career in such agencies. 2 lectures.

ABM 321 Agricultural Property Management and Sales (4)

Land economic, legal and real estate principles in the investment, development, leasing, mortgaging and transferring of agricultural real estate. 3 lectures, 1 two-hour laboratory.

ABM

ABM 322 Advanced Agricultural Business Management (4)

Agricultural business management with primary emphasis on economic analysis; application of economic principles to the solution of basic pricing, output, and resource use problems encountered by the individual agricultural business firm. 3 lectures, 1 two-hour laboratory. Prerequisite: Ec 211

ABM 323 Advanced Agricultural Business Management (4)

Agricultural business management with primary emphasis on cost accounting procedures, policy formation, financial, fiscal and material resources management. Includes budgets, business statements and other planning and control procedures. Agricultural business insurance, taxation, office management, and related phases in management of the agricultural business firm. 3 lectures, 1 two-hour laboratory. Prerequisite: Actg 222 and ABM 322 or consent of instructor.

ABM 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

ABM 402 Agricultural Business Communication (3)

Principles, methods and materials for communicating ideas, information and skills to management, staff members, stockholders, customers and general public. Agricultural business public relations programs. Organization and presentation of surveys, studies, reports and publications. 2 lectures, 1 two-hour laboratory. Prerequisite: Eng 218 and senior standing.

ABM 403 Agricultural Labor Relations and Personnel Management (3)

Agricultural labor trends and problems as determined by changes occurring in farming and farm related industries. Labor-management relations in agriculture; principles and procedures in organizing and managing the agricultural business personnel program. 3 lectures. Prerequisite: Senior standing.

ABM 412 Wholesaling and Retailing Agricultural Commodities (3)

The field of wholesaling and retailing agricultural commodities including auctions, commission houses, commission merchants, food brokers, carlot receivers, jobbers, shippers and supply houses. Principles of buying and selling; terms and trade customs. 3 lectures. Prerequisite: Ec 211, AM 304

ABM 421 Agricultural Business Operations Analysis (4)

Principles and procedures in agricultural business operations analysis and research. Evaluation of programs and problems to achieve optimal decisions. Production and financial data, statistics, pricing, costs, inventories, production level, and plant expansion or contraction. 3 lectures, 1 two-hour laboratory. Prerequisite: ABM 322, Stat 212

ABM 427 Agricultural Estate Planning (4)

Principles and procedures in agriculture estate planning and conservation. Determining agriculture estate assets, taxes, property valuation, property transfers, beneficiaries and needs, gifts, insurance, business estate, employee estate, wills, trusts, and administration of trusts and estates. 3 lectures, 1 activity period. Prerequisite: ABM 321

ABM 443 Field Studies in Agricultural Business Management (2)

California commercial agricultural businesses. Visitation to selected industries. Organization, operation, services and problems considered. One week in field and one week laboratory analysis and evaluation of data obtained on the trip. Prerequisite: Senior standing or consent of instructor.

ABM 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

ABM 463 Undergraduate Seminar (2)

Student presentation and leadership; group participation under faculty supervision on new agricultural business developments. 2 lectures.

ABM 515 International Agri-Business Marketing (3)

Problems and techniques of U.S. international marketing. Sales promotion, advertising, and market research for agricultural commodities. Tools, equipment, and supplies for agriculture in the developing countries. 3 lectures. Prerequisite: AM 304, FM 307 or consent of instructor.

ABM 516 Communication for Change in Developing Countries (3)

Analysis of literature, techniques and procedures for planning and carrying out agricultural information programs in developing countries. Current relevant information for foreign agricultural producers. 3 lectures. Prerequisite: FM 307

ABM 581 Graduate Seminar in Agricultural Business Management (3)

Current trends and characteristics of agricultural business and industry. Opportunities and requirements for becoming established in farm-related businesses. 3 lecture-discussions.

AGRICULTURAL EDUCATION

Ag Ed 202 Introduction to Agricultural Education (2)

Overview of agricultural education programs including goals and purposes. Kinds of classes and types of programs. Qualifications essential to success in teaching agriculture. Planned program of studies to meet requirement for teaching. 2 lectures.

Ag Ed 403 Teaching Plans and Procedures in Agricultural Education (3)

Preparation for student teaching in agriculture. Orientation to classroom situation. Development of plans for teaching including daily lessons and unit plans; utilization of source information and resources. Class demonstrations in teaching procedures; analysis and evaluation. 1 lecture, 2 activity periods.

Ag Ed 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

Ag Ed 520 Program Development in Agricultural Education (3)

Development of up-to-date approaches to a total integrated program based on occupational opportunities and community needs. Philosophy, organization and administration of agricultural education programs. Development in such areas as curriculum, supervised occupational experience, Future Farmers of America, and summer programs. 3 lectures.

Ag Ed 521 Curriculum and Methods in Agricultural Education (3)

Principles and methods of developing curricular objectives, content, and calendar including methods, procedures and materials adapted for use in classroom, shop and field instruction. Problems related to conducting classes and other experiences encountered while student teaching. Application of the teacher-learning process. Concurrent with student teaching. 3 lectures.

Ag Ed 522 Instructional Programs in Agricultural Mechanics (3)

Organizing the vocational agriculture mechanics curriculum and determining course content. Student demonstrations and presentations; evaluation and analysis. 1 lecture, 2 laboratories.

Ag Ed 523 Adult and Continuation Education in Agriculture (2)

Organization, history, philosophy, administration and teaching of classes for out-of-school youth and adults. Surveys and plans for development of rural and urban adult education programs. Young Farmer program. Techniques and methods of leadership. 2 lectures.

Ag Education

Ag Ed 525 Student Teaching in Agricultural Education (3-12)

Off-campus assignment to a selected cooperating public school for a three to four month period. Participation in the duties and activities of a teacher of agriculture including departmental organization and administration. Work conducted under the supervision of a fully credentialed and qualified teacher of agriculture and an Agricultural Education Department representative. A full-time assignment for vocational agriculture teaching candidates and a minimum half-time assignment ($\frac{1}{2}$ day) for general agriculture teaching candidates. Prior approval and appointment necessary.

Ag Ed 580 Special Problems in Agricultural Education (1-3)

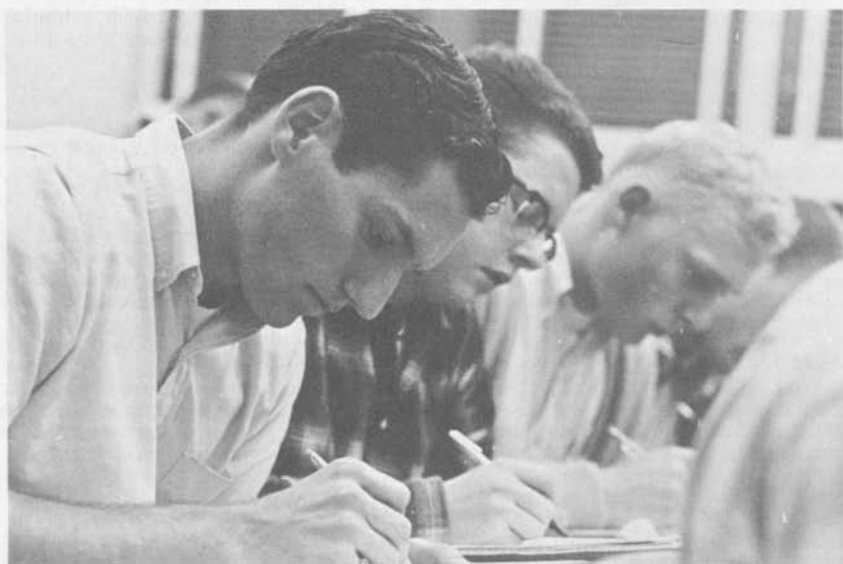
Individual study of modern issues and problems conducted through research, planning and development. Field problems and in-service study in agricultural industry encouraged. Final written report to be submitted. Total credit limited to nine units with not more than three units in any one quarter. Prior approval of instructor required.

Ag Ed 621 (A-Z) Technical Agricultural Developments (1-3)

Group study of new technological and scientific agricultural and related occupations. Provided through such activities as workshops, special meetings and assignments. Prior departmental approval necessary.

Ag Ed 631 (A-Z) Professional Conference in Agriculture (1-3)

A series of lectures, seminars and/or workshops concerning agricultural education conducted by specialists in the field. New developments in teaching and methodology at various levels of instruction; assessment of innovations and procedures. For the professional improvement of vocational educators.



AGRICULTURAL ENGINEERING

AE 100 Agricultural Engineering (1)

Professional opportunity. Solution of agricultural engineering problems requiring coordinated mathematical, graphical and written expression. 1 lecture.

AE 121 Agricultural Mechanics (2)

Identification and use of tools and materials; tool sharpening and care; concrete mixes and materials; simple electric wiring; metal work; pipe fitting; basic wood-working; estimating quantities and costs. 1 lecture, 1 laboratory.

AE 122 Agricultural Mechanics (2)

Design, construction and repair of production equipment for specific farming enterprises. Construction of livestock, dairy, crops, soils, poultry and horticultural equipment. Students register for this course in sections according to their specific major. 1 lecture, 1 laboratory. Prerequisite: AE 121 or demonstrated equivalent ability.

AE 128 Agricultural Mechanics (2)

Selection of materials for farm construction. Plans, interpretation and bills of materials. Development of skills in wood and metal working. Concrete proportioning and quality tests. 1 lecture, 1 laboratory. Prerequisite: completed or concurrent college drafting.

AE 130 Irrigation Practices (2)

Application of good irrigation practices on the farm. Choice and evaluation of methods; soil, water, and plant relationships; when and how much water to apply; water measurement; water quality and drainage; elements and operation of irrigation systems. 1 lecture, 1 laboratory. Prerequisite: SS 121, Math 103

AE 131 Agricultural Surveying (2)

Introduction to basic surveying techniques as applied to agriculture. Keeping field notes; land measurement by tape; differential and profile leveling; contour and plane table mapping; land surveying and identification; fundamentals of land grading. 1 lecture, 1 laboratory. Prerequisite: Math 103

AE 133 Agricultural Drafting (2)

A basic course in technical drawing oriented toward working drawings of farm shop projects. Freehand sketching and instrument techniques. Multiview projection and pictorial drawings. 2 laboratories.

AE 134 Agricultural Electrification (3)

Fundamentals of electric wiring and code regulations; selection, installation and maintenance of electric motors. For students other than degree majors in Agricultural Engineering or Mechanized Agriculture. 2 lectures, 1 laboratory. Prerequisite: Math 103 or 113

AE 141 Agricultural Tractors and Equipment Skills (2)

Skills in the practical operation of tractors and equipment. Supervised operational practice on modern farm and utility industrial equipment in production agriculture and light earth moving operations. 2 laboratories.

AE 142 Agricultural Power and Machinery Management (4)

Evaluation of agricultural tractors and machinery performance. Power applications and hydraulic systems. Evaluation of performance of tillage, seeding and planting, weed control, hay and grain harvesting, and farm processing equipment. Emphasis on management. Selection, operation, maintenance, and cost analysis. 3 lectures, 1 laboratory.

AE 143 Power and Machinery (4)

Performance of tractors and machinery. Evaluation of tillage, planting, and harvesting operations. Analysis and development of optimum mechanical systems. 3 lectures, 1 laboratory.

Ag Engineering

AE 145 Survey of Aerial Photogrammetry (3)

Object recognition, three-dimensional equipment, and interpretation. Print alignment, stereoscopic viewing, scales, elevation determination, and application. Familiarization with geological, agricultural, land and crop management, engineering surveys, construction data, topographic detail, drainage elevation and control. Color photo techniques and uses for pest and disease location and control. 2 lectures, 1 laboratory. Prerequisite: Math 103 or 114

AE 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

AE 228 Cotton Ginning (4)

Cotton fiber production, cultural practices, harvesting methods and equipment; cleaning, drying and ginning methods including survey of equipment, its use and management; fiber quality measurements, packaging, storing and selling cotton products. 3 lectures, 1 laboratory.

AE 231 Agricultural Building Construction (3)

Development of practical skills in carpentry and light construction. Selection of materials. Agricultural buildings repaired, constructed, or modified during laboratory periods. 1 lecture, 2 laboratories. Prerequisite: AE 121 or AE 128

AE 232 Agricultural Structures Planning (3)

Environmental factors affecting crop storage structures and animal housing. Insulation, heating, ventilation, water supply, and waste disposal. Functional planning of production systems. 2 lectures, 1 laboratory. Prerequisite: Phys 132 and college drafting.

AE 234 Agricultural Power Transmission (3)

Elements of the transmission, measurement and utilization of power in agriculture. Problem solution, engineering reports, graphical studies, pumping machinery and engine cycles. 2 lectures, 1 laboratory. Prerequisite: AE 142

AE 236 Principles of Irrigation (4)

Fundamental characteristics of soil, water, and plants as they affect irrigation practices: consumptive use; water rights, supplies and schedules; water quality and salinity; irrigation methods and evaluation. 3 lectures, 1 laboratory. Prerequisite: Math 141, SS 121

AE 237 Engineering Surveying (2)

Selection, care and use of tapes, levels and transits. Keeping field notes; land measurement by tape; differential and profile leveling, and the plotting of profiles. Introduction to the transit; field operation; introduction to traverses. 1 lecture, 1 field period. Prerequisite: Math 115 or equivalent; college drafting.

AE 238 Engineering Surveying (2)

Use of the transit: traverses, coordinates, triangulation, area and balanced survey calculations. Cross sections, landgrading, and volumes. Topographic and contour by stadia-transit mapping. 1 lecture, 1 field period. Prerequisite: AE 237

AE 239 Engineering Surveying (2)

Parabolic curves, circular curves, cross sectioning, setting slope stakes, measuring earth volume, cuts and fills as applied to road beds, public land surveys, photogrammetry. 1 lecture, 1 field period. Prerequisite: AE 238

AE 240 Agricultural Engineering Laboratory (1-2)

Total credit limited to 4 units with no more than 2 units in any one quarter. 1 or 2 laboratories

AE 302 Agricultural Waste Management (3)

Scope of the agricultural pollution problem; standard methods of measuring pollution; water quality; nutrient budget studies; management of animal wastes; management of pollution by crop residue, fertilizers, herbicides, and pesticides; legal and political aspects of pollution. 3 lectures. Prerequisite: Chem 122, junior standing

AE 312 Hydraulics (4)

Static and dynamic characteristics of liquids, flow in open and closed channels, uniform and non-uniform flow, flow measurement, pumps. 3 lectures, 1 laboratory. Prerequisite: Phys 132, ME 211

AE 315 Hydrology (3)

Collection, organization and use of precipitation and runoff data, flood frequency and economics of structures, stream gauging and use of hydrograph, principles of groundwater management and flood routing. 3 lectures. Prerequisite: Math 141

AE 320 International Agricultural Mechanization (3)

Agricultural mechanization abroad. Farm machinery design in Europe and Japan. Traditional farming methods and tools in tropics. Problems of agricultural mechanization in developing countries. Agricultural engineering education, research and extension in various developed and developing countries. 3 lectures. Prerequisite: AE 142 or 143

AE 321 Agricultural Equipment Industry Management (4)

Management and operation of the farm equipment industry. Study of sales, service, parts and product education policies on manufacturer, distributor and dealer level. 3 lectures, 1 laboratory. Prerequisite: AE 142

AE 322 Principles of Agricultural Machinery (3)

Principles and evaluation of agricultural power units and machines. Soil-equipment mechanics and tractor-implement combinations. 2 lectures, 1 laboratory. Prerequisite: AE 142

AE 323 Agricultural Products Handling (3)

The application of product handling techniques and equipment to the processing of agricultural commodities. 2 lectures, 1 laboratory. Prerequisite: Math 114 or consent of instructor

AE 324 Principles of Agricultural Electrification (3)

Power distribution and DC and AC circuit fundamentals. Principles of wiring layout. Materials, code regulations and electrical measurements applicable to various agricultural uses. 2 lectures, 1 laboratory. Prerequisite: Phys 123

AE 325 Agricultural Electric Power and Controls (3)

Single-phase and three-phase electric motors and protective devices for agricultural use. Identification, selection, installation, and maintenance of various types. Operating characteristics and drives. Applications of electronic controls to agriculture. 2 lectures, 1 laboratory. Prerequisite: AE 324

AE 326 Off-the-Road Locomotion (4)

Sources and systems for supplying power to off-the-highway vehicles. Theory of traction, soil equipment mechanics, prime mover and implement combinations. 3 lectures, 1 laboratory. Prerequisite: AE 143, ME 302

AE 327 Agricultural Process Engineering (4)

Thermodynamics and mass transfer principles applied to air, water, air-water mixtures, drying, heating, refrigeration, fluid flow, size reduction, fan laws and materials handling. 3 lectures, 1 laboratory. Prerequisite: AE 312 and ME 302

Ag Engineering

AE 328 Multiple Use Water Management (4)

Water occurrence, quality and measurement. Water conservation and treatment. Multiple use of water in private, local, state and federal projects. 3 lectures, 1 laboratory.

AE 329 Tropical Rural Development (4)

Economic considerations, traditional methods and techniques, available materials, analysis of low cost improved equipment. Market road system planning and construction. Water supply and sanitation, low cost rural housing, food storage and farm structures. 2 lectures, 2 laboratories.

AE 330 Agricultural Environment Control (2)

Current research findings on optimum environment for agricultural production. Structures and equipment used to control animal and plant environment. 1 lecture, 1 laboratory. Prerequisite: Junior standing in Agriculture and permission of instructor.

AE 331 Irrigation Systems Design (3)

Choosing adapted irrigation methods, design of surface and sprinkler irrigation systems, land grading calculations for optimum grades and economic soil movement. 2 lectures, 1 laboratory. Prerequisite: AE 236 and 312, or AE 340 and approval of instructor

AE 332 Agricultural Buildings (3)

Selection of buildings, storage units, and related equipment for production agriculture. Environmental factors affecting crop storage and animal housing. Farmstead layouts. Working drawings and cost estimates. 2 lectures, 1 laboratory. Prerequisite: Junior standing and a course in drafting.

AE 333 Engineering Properties of Agricultural Materials (3)

Principles of analyzing the mechanical, electrical, thermal, rheological and optical characteristics of agricultural materials. 2 lectures, 1 laboratory. Prerequisite: Aero 207, AE 338

AE 335 Agricultural Power (3)

Principles of spark ignition and compression ignition engines, including liquefied petroleum gas equipment, and related accessories. Service, trouble-shooting and repair procedures of engines and transmissions. 2 lectures, 1 laboratory.

AE 336 Agricultural Power Analysis (3)

Selection and application of internal combustion engines. Theory of combustion, fuels, and lubricants; power and its measurement. Factors affecting horsepower output and engine efficiency. Advanced power transmission, electrical systems. 2 lectures, 1 laboratory. Prerequisite: AE 335, Phys 123

AE 337 Landscape Utility Systems and Construction (3)

Survey of electrical power and lighting systems, irrigation for landscape areas, drainage systems, earth shaping and retention, construction of minor structures; understanding of building codes. 2 lectures, 1 laboratory. Prerequisite: Junior standing

AE 338 Dynamic Measurement (4)

Types and application of transducers, receivers, recorders and automatic controls in agriculture. 3 lectures, 1 laboratory. Prerequisite: AE 327, EE 201

AE 339 Agricultural Mechanics Skills (3)

Advanced shop skills. Carpentry, electricity, plumbing, surveying, power mechanics, tractor equipment operation and maintenance. 1 lecture, 2 laboratories. Prerequisite: Junior standing.

AE 340 Irrigation (4)

Soil-plant-water relationships, consumptive use rates and irrigation schedules, water quality, salinity and drainage; evaluations of irrigation methods, water rights and irrigation institutions. Flow of water in pipes and canals, water measurement, wells, and pumps. 3 lectures, 1 laboratory.

AE 341 Gasoline Engine Diagnosis (2)

Use of modern engine testing equipment in the evaluation of engine components and accessories such as: cylinder condition, ignition systems, electrical systems, and fuel systems. 1 lecture, 1 laboratory. Prerequisite: AE 335 or equivalent

AE 342 Diesel Engine Diagnosis (2)

Diagnosis and service of diesel fuel systems. Use of modern test and service equipment in evaluating and servicing these systems. 1 lecture, 1 laboratory. Prerequisite: AE 335 or equivalent

AE 344 Agricultural Equipment Projects (3)

Design and construction of special agricultural equipment related to any agricultural enterprise. 1 lecture, 2 laboratories. Prerequisite: AE 122 or 128; college drafting

AE 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems in agriculture. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

AE 414 Irrigation Engineering (4)

Problems of irrigation water supply and distribution found in irrigation districts or large farms; influence of soils, crops and climate on frequency, rate and duration of water delivery; design of open and closed conduits, float valves, pumps and reservoirs; costs and engineering economics of irrigation systems for efficient water delivery and use. 3 lectures, 1 laboratory. Prerequisite: AE 312, 331

AE 421 Equipment Engineering (4)

Design and construction of specialized agricultural equipment. 2 lectures, 2 laboratories. Prerequisite: Aero 207, ME 324, ME 212, WM 142

AE 422 Equipment Engineering (4)

Analysis and design of equipment with emphasis on man-machine-plant-automata relationships and concepts. 3 lectures, 1 laboratory. Prerequisite: AE 421

AE 425 Utility-Industrial Equipment (4)

Cost analysis of utility and industrial equipment with emphasis on management, selection, operation and maintenance. Evaluation of performance of bulldozers, earth-moving equipment, cranes, air compressors and rigging. 3 lectures, 1 laboratory. Prerequisite: IE 403

AE 431 Closed Circuit Hydraulics (3)

Proper selection and maintenance of machine components using standardized design procedures and manufacturer's design literature. 2 lectures, 1 laboratory. Prerequisite: AE 234 or 312

AE 433 Agricultural Structures Design (3)

Structural analysis and design of agricultural service and processing buildings. Emphasis on use of wood and metals in light construction. 2 lectures, 1 laboratory. Prerequisite: AE 232, Aero 207

AE 434 Reinforced Concrete (3)

Mechanics of reinforced concrete; working stress and ultimate strength. Design of beams, columns, floor systems, foundations and retaining walls. 2 lectures, 1 laboratory. Prerequisite: AE 433

AE 435 Drainage (3)

Flow of water in porous media; intrinsic permeability and hydraulic conductivity; flow nets; wells and groundwater; design of subsurface drains. 2 lectures, 1 laboratory. Prerequisite: AE 236 and AE 312, or AE 340 and approval of instructor.

Ag Engineering

AE 437 Conservation Engineering (3)

Principles of soil and water conservation including the fundamentals of soil mechanics used in the design of compacted earth fills. Practice in the design of important types of soil and water conservation structures. 2 lectures, 1 laboratory. Prerequisite: AE 312, SS 202.

AE 439 Agricultural Mechanics—Facility Management (3)

Major factors and techniques in planning, organizing and managing agricultural mechanics instruction shops and facilities. For students preparing to teach agriculture. 2 lectures, 1 laboratory. Prerequisite: minimum of 8 units of Agricultural Engineering and Welding & Metallurgical courses.

AE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

AE 463 Undergraduate Seminar (2)

Group discussion of current agricultural engineering topics presented by individual members of the class. Topics or papers presented by guest speakers. Placement opportunities and requirements. 2 lectures.

AE 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

AE 520 Special Problems and Topics (1-3)

Individual or group investigation, research, studies or surveys of selected problems. Total credit limited to 3 units. Prerequisite: consent of instructor.

AE 521 Engineering of Agricultural Equipment (3)

Harvesting machines analyzed from the mechanical, operational, and economic standpoint. Emphasis on optimum harvesting systems. 2 lectures, 1 laboratory. Prerequisite: AE 333, 422 or equivalent.

AE 522 Agricultural Processes Engineering (4)

Engineering principles involved in handling, conditioning and storage of agricultural products. Advanced practical analysis and design of agricultural systems from harvest to utilization. 3 lectures, 1 laboratory. Prerequisite: AE 327, ME 302 or equivalent

AE 532 Water Resources Institutions and Planning (4)

Philosophical, institutional, and legal aspect of water resources. Relationship of development of water resources to development of other natural resources. Local, state and federal role in water resource development and planning. 3 lectures, 1 laboratory. Prerequisite: NRM 302, graduate standing and consent of instructor.

AE 533 Advanced Irrigation System Design (4)

Design and economic evaluation of complex sprinkler and surface irrigation systems. 3 lectures, 1 laboratory. Prerequisite: AE 331 or equivalent.

AE 581 Graduate Seminar in Agricultural Engineering (3)

Group study of current engineering problems and recent developments as they relate to agriculture. Problem identification, statement and research methodology are emphasized in problem solution. 3 seminars.

AE 599 Engineering Report (2) (2) (5)

Directed study with limited supervision of important, practical engineering problem-solving. Preparation of a comprehensive report. Total credit limited to 9 units with maximum of 5 units per quarter. Prerequisite: consent of instructor.

AGRICULTURAL MANAGEMENT

AM 101 Introduction to Agribusiness (3)

Survey of Agricultural Businesses; introduction and orientation to the Agricultural Management Department and the college; careers in public and private agricultural businesses and service agencies; changes and growth of agriculture, with emphasis on California. 3 lectures

AM 102 Introduction to Agricultural Economics (3)

Introduction to the economic aspects of agricultural management. The role of agricultural resources in economic growth. Survey of trade, policy, and marketing activities of agriculture. 3 lectures.

AM 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

AM 212 Agricultural Economics (3)

Changes in agriculture and agricultural production in response to changing economic conditions. Optimum methods of agricultural production. Impact of technological change. Evaluating market structure and price formulating factors for agricultural products and inputs. 3 lectures. Prerequisite: Ec 211

AM 250 Computer Application to Agriculture (2)

Use of "library" programs available for agriculture and auxiliary equipment available at commercial computer centers. Automated record keeping systems. Statistical and other computer programs applied to agricultural problems. 2 activities.

AM 304 Agricultural Marketing (3)

Application of economic principles to the marketing of agricultural commodities. Market channels with emphasis on futures trading, market information, storage, and transportation. Implications of the foreign market to agriculture with emphasis on the effect on California production. 3 lectures. Prerequisite: Ec 201 or 211

AM 339 Agribusiness Management Internship (12)

The selected student will spend one quarter with a selected agribusiness. This period of time will be spent applying and developing managerial skills and abilities. Prerequisite: Consent of instructor

AM 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

ANIMAL SCIENCE

A Sci 101 Feeds and Feeding (4)

Simple use of food nutrients. Identification and classification of feeds for each class of livestock. The digestion and utilization of feeds. Feeding standards and computation of simple rations for livestock. Economy in feeding and purchasing feeds by nutritive values. 3 lectures, 1 laboratory.

A Sci 121 Market Beef Production (4)

Breeds, market classes, and grades of beef cattle. Selection of feeder cattle. Management practices in purchasing and fattening cattle using farm grown feeds. Study of cattle feeding operations carried on at the college. Marketing of beef cattle. 3 lectures, 1 laboratory. Prerequisite: A Sci 101

A Sci 122 Elements of Swine Production (4)

History, development and importance of swine industry. Types, breeds, market classes and grades of swine. Basic principles and practices of swine feeding and management. 3 lectures, 1 laboratory.

Animal Science

A Sci 123 Elements of Sheep Production (4)

Survey of the types of sheep operations in California. Breed study, market classes, and grades identification. Commercial fattening of lambs in dry lot and irrigated pasture programs. Calendar of operations for the various types of sheep enterprises. 3 lectures, 1 laboratory.

A Sci 131 Basic Equitation (3)

Grooming, saddling, bridling, mounting, seat and hands. Horsemanship both under saddle and bareback. Basic care of the horse. Study of types of horse gear and equipment. Designed to teach basic riding to students with no previous experience. 1 lecture, 2 laboratories.

A Sci 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

A Sci 221 Sheep Management (4)

Detailed study of managerial practices for both commercial and purebred sheep enterprises. Performance testing and carcass evaluation techniques. The preparation and merchandising of the wool clip. Introduction to wool processing. 3 lectures, 1 laboratory. Prerequisite: A Sci 101, 123

A Sci 222 Commercial Beef Management (4)

Care and management of a breeding herd of commercial cattle in California. Range and farm lands suited to beef production. Factors affecting cost of production. Improvement of breeding herd. Trends in the industry. 3 lectures, 1 laboratory. Prerequisite: A Sci 101, 121

A Sci 223 Swine Management (4)

Management practices involved in commercial and purebred swine enterprises. Methods of production and marketing, performance testing programs and carcass evaluation techniques. Nutritional requirements, rations, diseases and parasites, facilities and equipment. 3 lectures, 1 laboratory. Prerequisite: A Sci 101, 122

A Sci 226 Livestock Judging (3)

Application of visual appraisal techniques to the selection of beef cattle, sheep, swine and horses. 1 lecture, 2 laboratories.

A Sci 229 Range Management (4)

Characteristics of rangeland, identification of range plants, management practices to maintain range resources and increase production of forage and livestock. 3 lectures, 1 laboratory. Prerequisite: SS 121, A Sci 121 or 230, a botany or crops science course.

A Sci 230 General Animal Science (4)

For non-animal science majors. Selection, feeding, and management of sheep, swine, and cattle, and their uses on California farms. 3 lectures, 1 laboratory.

A Sci 232 Elements of Horse Management (3)

Status of the horse industry. Breeds of horses and their uses. Anatomy and parts of the horse, horse judging. Study of good and faulty conformation. Unsoundnesses, ailments and their treatment. Determination of age. Early history of the horse. 2 lectures, 1 laboratory. Prerequisite: A Sci 101

A Sci 234 Horseshoeing (2)

Fundamentals of horseshoeing, anatomy and physiology of the horse's foot, pastern, and legs. Trimming feet, fitting and nailing shoes. Normal shoeing, corrective shoeing. 1 lecture, 1 laboratory combined.

A Sci 302 Applied Animal Nutrition (3)

Feedstuff evaluation and analysis. Advancements in feedstuff evaluation and application to ration formulation. Principles and practices in livestock ration formulation. Linear programming principles as applied to computer formulated rations. 2 lectures, 1 laboratory. Prerequisite: A Sci 101, Chem 226

A Sci 304 Animal Breeding (3)

Application of genetics to the improvement of farm animals. Improving production through a study of mating systems including outbreeding, inbreeding, selection techniques, performance testing and evaluating, herd records, indexing and progeny testing. Setting up and organizing improved breeding programs using modern techniques and equipment. 3 lectures. Prerequisite: Bio 303

A Sci 323 Beef Husbandry (4)

Purebred cattle business including selection of foundation stock, herd bulls; breeding programs; pedigrees; facilities and equipment; feeding breeding herd, sale cattle, show cattle; marketing purebred cattle; and general management problems. 3 lectures, 1 laboratory. Prerequisite: A Sci 101, 121, 222

A Sci 326 Advanced Livestock Judging (2)

Intensive practice in livestock judging in preparation for livestock judging team to compete in intercollegiate contests. 2 laboratories. Prerequisite: A Sci 226

A Sci 332 Range Technology (4)

Fundamentals of rangeland survey and inventory. Application of ecology in range evaluation. Analysis of range condition and capacity. Development of plans for effective improvement and utilization of rangeland. 3 lectures, 1 laboratory. Prerequisite: A Sci 229

A Sci 333 Horse Husbandry (3)

Management of the breeding farm. Farm layout. Inheritance, pedigrees, diseases, breeding problems, nutrition, study of estrous cycles, and servicing the mare. Handling stallions. Sale preparation. Breeding and feeding records, office procedure, selection of breeding stock. 2 lectures, 1 laboratory. Prerequisite: A Sci 232

A Sci 334 Feed Mill Operation (3)

Study of general operation of a feed mill including a survey of the industry, buying, storing, grinding, weighing, mixing, packaging, handling, and delivery of formula feeds. Also a study of flow of materials, preventive maintenance and safety in a mill. 2 lectures, 1 laboratory. Prerequisite: A Sci 101 and 1 year production courses, or A Sci 230, PI 230 or DH 230

A Sci 335 Range Livestock Economics (3)

Economic structure of the range livestock industry; economics of rangeland use; factors affecting income and costs of range operations; ranchland values; capital and credit for range enterprises; range conservation relationships with ranch operators. 3 lectures. Prerequisite: Junior standing and A Sci 229

A Sci 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head

A Sci 401 Reproductive Physiology (3)

Intensive study of reproductive efficiency of farm animals. Anatomy and physiological factors involved in reproduction. Male and female systems, pregnancy, estrual behavior, semen collection and evaluation, artificial insemination, pregnancy testing, and hormone therapy. 2 lectures, 1 laboratory. Prerequisite: VS 123

A Sci 402 Animal Nutrition (4)

The metabolism of proteins, carbohydrates, fats, minerals, and vitamins. Relationship of proper nutrition to livestock production. 3 lectures, 1 laboratory. Prerequisite: A Sci 302 or equivalent, Chem 328

A Sci 426 Live Animal and Carcass Evaluation Techniques (2)

Relationship between live meat animal evaluation and carcass evaluation. Visual appraisal techniques used in the evaluation and analysis of live meat-type animals related to the selection and grading techniques of carcasses. 2 laboratories. Prerequisite: A Sci 226, FI 212

Anthropology/Archaeology

A Sci 434, 435 Specialized Horse Enterprises (3) (3)

Early schooling of the young horse through advanced training. Use of the snaffle bit, hackamore, half-breed and Spanish bits. Gentling and ground work. Training in collection, turning, backing, leads, trailer loading, rope work, cattle work. For advanced students. 1 lecture, 2 laboratories. Prerequisite: A Sci 333 or appropriate experience.

A Sci 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

A Sci 463 Undergraduate Seminar (2)

Major developments in the chosen field of the student. Discussion of new developments, policies, practices, and procedures. Each individual is responsible for the development and presentation of a topic in his chosen field. 2 lectures.

A Sci 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

A Sci 504 Ruminant Nutrition (4)

Concentrated study of ruminant nutrition. The physiological and biochemical aspects of digestion, absorption, and metabolism. Significance of rumen micro-organisms related to energy, protein, and vitamin metabolism. Current research techniques employed in ruminology. 3 lectures, 1 laboratory. Prerequisite: A Sci 101, 402

A Sci 580 Seminar in Animal Nutrition (3)

Current findings and problems in the field of animal nutrition. Effects of new experimental research on the livestock industry. 3 lectures.

A Sci 581 Graduate Seminar in Animal Production (3)

Current findings and research problems in the field and their application to the industry. 3 lectures.

ANTHROPOLOGY

Ant 201 Cultural Anthropology (3)

The meaning and significance of culture to human beings. Examination of how cultures differ in their impact on behavior. How cultures develop and change. 3 lectures.

Ant 301 Applied Anthropology (3)

Survey and interpretation of the central cultural characteristics of North Americans. Analysis of misunderstandings which develop as a result of divergent value systems, ethical codes, patterns of etiquette and linguistic psychology when persons meet and attempt to function across cultural barriers. 3 lectures. Prerequisite: Ant 201

ARCHAEOLOGY

Ar 301 California Archaeology (3)

The California Indians; field studies in locating, surveying, and analyzing aboriginal sites; excavation of a site; laboratory techniques for recording, preserving, and reporting of artifacts; relating observations and finds to the natural environment in which a site is located. Integrating knowledge of natural and social sciences to use of archaeology. 2 lectures, 1 laboratory.



ARCHITECTURE AND ARCHITECTURAL ENGINEERING

Arch 106 Materials of Construction (3)

The use and application of building materials, structural makeup of buildings. 3 lectures.

Arch 111 Introduction to Design (2)

Familiarization with the professional fields of architecture, engineering and city planning. Introduction to the design process and development as a basis for architectural analysis. 2 lectures.

Arch 132 Introduction Design (2)

Continuation of Arch 111 stressing critical evaluation of man's environment. 1 lecture, 1 laboratory. Prerequisite: Arch 111 or consent of school.

Arch 140 Descriptive Drawing (1)

Exercises in drawing without mechanical aids. Total credit limited to 3 units, not more than 1 unit in any one quarter. 1 laboratory.

Arch 143 Introduction to Design (2)

Continuation of Arch 132. Study of visual phenomena with application to elementary composition dealing with line, area, color and materials. 2 laboratories. Prerequisite: Arch 132 or consent of school.

Arch 144 Introduction to Drawing and Perspective (3)

Basic techniques used in graphic communication. Orthographic and isometric projection. Mechanical perspective, shades and shadows. 3 laboratories.

Arch 145, 146 Delineation (2) (2)

Three-dimensional representations with various drawing media which enable the student to express his architectural ideas. 2 laboratories. Prerequisite: Arch 140, 144 or consent of school.

Arch 147 Graphics (7)

Covers material in Arch 144, 145, 146. Primarily for transfer students. Partial credit may be granted. 7 laboratories.

Architecture

Arch 148 Introduction to Design (6)

Covers material in Arch 111, 132, 143. Primarily for transfer students. Partial credit may be granted. 3 lectures, 3 laboratories.

Arch 205, 206 Strength of Materials (3) (3)

Physical properties of construction materials. Moment and shear diagrams; axial and eccentric loading; deflection. Sizing of structural members of homogeneous and compound materials. 3 lectures. Prerequisite: Phys 131, Math 142 or consent of school.

Arch 207 Strength of Materials (6)

Covers material in Arch 205, 206. Primarily for transfer students. Partial credit may be granted. 6 lectures. Prerequisite: Phys. 131, Math 142 or consent of school.

Arch 231, 232, 233 Architectural Practice (3) (3) (3)

Construction techniques and working drawings for wood frame and steel frame structures. Theory and application of laws and codes affecting buildings. Theory and application of cost estimating procedures. 1 lecture, 2 laboratories. Prerequisite: Arch 106 or consent of school.

Arch 234 Architectural Practice (9)

Covers material in Arch 231, 232, 233. Primarily for transfer students. Partial credit may be granted. 3 lectures, 6 laboratories. Prerequisite: Arch 106 or consent of school.

Arch 237, 238 Architectural Photography (2) (2)

Photographic and presentation techniques applicable to architectural subjects. 1 lecture, 1 laboratory. Prerequisite: Arch 144, Jour 221 or consent of instructor.

Arch 240 Additional Engineering Laboratory (1-2)

Total credit limited to 4 units with not more than 2 units in any one quarter. 1 or 2 laboratories.

Arch 241, 242, 243 Watercolor (1) (1) (1)

Outdoor sketching with watercolor. 1 laboratory. Prerequisite: Arch 146

Arch 244, 245, 246 Advanced Delineation (2) (2) (2)

Architectural presentation for third, fourth, and fifth year students in Architecture. Development of further proficiency in drawing techniques through projects and critiques. 2 laboratories. Prerequisite: Arch 146

Arch 247 Form and Materials (2)

Design explorations with architectural ceramics, metals, plastics, wood and stone. 2 laboratories. Prerequisite: Arch 140, 144

Arch 250 Engineering Problems—Digital Computers (2)

Solution of selected engineering problems by means of digital computers. 2 activities.

Arch 251, 252, 253 Basic Design (3) (3) (3)

Continuation of Arch 143. Development of design skills through studies of spatial problems of increasing architectural complexity. Circulation, flow, and human needs with respect to architecture. One designated field trip required. 3 laboratories. Prerequisite: Arch 143, 146 or consent of school.

Arch 301, 302 History of Non-Western Architecture (3) (3)

Ancient American, Far Eastern and Central Asian periods of architecture; philosophies and conditions which influenced them. For architects and others. 3 lectures. Prerequisite: Junior standing in the College.

Arch 304 Stress Analysis (3)

Stress analysis of statically determinate and indeterminate structures. 3 lectures. Prerequisite: Arch 206 or consent of school.

Arch 305, 306 Steel and Timber Structures (3) (3)

Design of steel members and connections, ties, trusses, plate girders, and determinate frames. Vertical and lateral loading. Light frame wood buildings, trusses, glued laminated wood arches, and connections. 3 lectures. Prerequisite: Arch 304 or consent of school.

Arch 307 Stress Analysis, Steel & Timber Structures (9)

Arch 307 will cover material presented in Arch 304, 305, and 306. 9 lectures. Prerequisite: Arch 206 or consent of school.

Arch 308, 309 Building Systems Design (3) (3)

Environmental systems and equipment available to the architect to make architectural spaces structurally, mechanically and esthetically functional. Engineering and design analysis, system comparisons, cost-benefit studies of building equipment. 3 lectures. Prerequisite: Arch 253, 233, EE 324, ET 313, EnvE 306

Arch 312 Home and Community Design (3)

For students not majoring in architecture. Historical development of the home and city and the effect of location, climate, social and technological factors on homes and cities. Considerations and design methodology; furniture, landscape, and relation of home to community environment. 3 lectures.

Arch 314, 315, 316 Design Analysis (2) (2) (2)

For engineering students. Studies in architectural design with emphasis on structural relationships. Arch 314, 315: 2 lectures; Arch 316: 2 activities. Prerequisite: Arch 233, 253

Arch 317, 318, 319 History of Architecture (3) (3) (3)

Periods of architecture; philosophies and conditions which influenced them. 3 lectures. Prerequisite: Eng 105

Arch 320 Color and Environment (2)

Theory and systemization of visible spectrum as it applies to architectural environment. Includes visual and psychological effects of color. Exercises pertain primarily to interior design. 1 lecture, 1 laboratory. Prerequisite: Arch 253, Psy 202

Arch 321 Photography of Historic Structures (2)

Photographic techniques used in the documentation of historic sites and structures. Emphasis on use of the camera as a recording instrument. 1 lecture, 1 laboratory. Prerequisite: Basic skills and consent of instructor.

Arch 322, 323 Model Analysis (2) (2)

Development of structural understanding by non-mathematical methods through the observation of models under load conditions. Introduction to model techniques of stress determination. 1 lecture, 1 laboratory. Prerequisite: Arch 206

Arch 324 Architectural Acoustics (2)

Design of hearing conditions in architectural spaces; sound distribution and diffusion; properties of structures and surface materials; room shapes as affecting acoustics with architectural considerations paramount. 2 lectures. Prerequisite: Phys 132, Arch 253

Arch 325, 326 Architectural Lighting (2) (2)

Influence of natural and artificial light on space, form, the human being and his architectural environment. Design of artificial lighting environments, sources of illumination, effects on textures, colors, illusions and moods, reflectance, absorption, glare control, diffusion and distribution, lighting economics, analysis of fixtures, controls. 1 lecture, 1 activity. Prerequisite: Phys 133 and Junior standing.

Arch 341, 342, 343 Architectural Practice (2) (2) (2)

Continuation of Arch 233. Masonry and concrete structures. Theory and application of specifications. Coordination with Architectural Design. 2 laboratories. Prerequisite: Arch 233, 253; Concurrent: Arch 351, 352, 353

Architecture

Arch 344 Stress Analysis Laboratory (1)

Standard tests of structural materials and structural components. Use of test equipment and strain gages. 1 laboratory. Prerequisite: Arch 206

Arch 346 Computer Analysis of Structure (2)

Solution of structural problems using existing programs. Creation of mathematical models from physical problems and solution by digital computer. 2 activities. Prerequisite: Arch 250, 305

Arch 347, 348, 349 Design for Planners (2) (2) (2)

Three dimensional design with emphasis on spatial relationships and urban forms. The physical city. Effect of color, texture and scale, open spaces. Landscaping and architecture. 2 laboratories. Prerequisite: CRP 243, Arch 253

Arch 350 Advanced Descriptive Drawing (2)

Advanced programs in descriptive drawing as continuation of Arch 140. 2 laboratories.

Arch 351, 352, 353 Architectural Design (4) (4) (4)

Continuation of Arch 253. Development of logical analysis and creative abilities through application of skills to the solution of architectural problems. 4 laboratories. Prerequisite: Arch 206, 233, 253

Arch 357 Industrial Presentation Techniques (2)

Graphic presentation for industrial engineers. Symbols, techniques, and freehand drawing. Construction drawings and flow diagraming. 2 laboratories.

Arch 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

Arch 401, 402, 403 Design Analysis (2) (2) (2)

Continuation of Arch 316. 2 activities. Prerequisite: Arch 316

Arch 404, 405, 406 Concrete and Masonry Structures (2) (2) (2)

Elements and design of concrete and masonry structures. Vertical and lateral loading in multi-story buildings. 2 lectures. Prerequisite: Arch 306, 344; Math 143; Phys 133

Arch 407 Plastic Design of Steel Structures (3)

Theory of plastic design, structural engineering methods used to design steel frameworks with plastic theory. 3 lectures. Prerequisite: Arch 306

Arch 409 Survey of Foundation Engineering (3)

Fundamentals of foundation engineering, evaluation of soil reports, principles of determination of bearing capacity, soil classification, selection of types of foundations, evaluation of expansive properties of foundation soils, discussion of basic laboratory tests. 3 lectures. Prerequisite: Arch 206

Arch 411 Matrix Analysis of Structures (2)

Analysis of structural systems by matrix algebra techniques primarily applicable to solution by digital computers. 2 lectures. Prerequisite: Arch 250, 306, Math 204

Arch 412 Dynamics of Framed Structures (2)

Analysis of stresses and deflections in structures subjected to dynamic loads. Emphasis is on matrix algebra development primarily applicable to solution of problems by digital computer. 2 lectures. Prerequisite: Arch 250, 306, Math 204

Arch 414, 415, 416 General Engineering (2) (2) (2)

Topics which serve to supplement and unify the professional engineering background. 2 lectures. Prerequisite: Arch 306, 344; Math 204; Chem 124; Phys 133

Arch 417, 418, 419 History of Architecture (2) (2) (2)

Arch 319 continued. Periods of architecture; philosophies and conditions which influenced them. 2 lectures. Prerequisite: Arch 319

Arch 421, 422 Soil Mechanics and Foundations (3) (3)

Principles and applications of soil mechanics; types of foundation construction; design of foundations for buildings and bridges. 2 lectures, 1 laboratory. Prerequisite: Arch 306; Math 204, 241; Phys 133; Chem 124

Arch 423 Advanced Foundation Engineering (2)

Analysis of foundation systems for large buildings, bridges, etc. Evaluation of test results, model analysis, special topics relative to foundation engineering, advanced work in triaxial testing, pore pressure effects, and slope stability analysis. 2 lectures. Prerequisite: Arch 422 or Arch 424

Arch 424 Soil Mechanics and Foundations (6)

Covers material in Arch 421, 422. Primarily for transfer students. 4 lectures, 2 laboratories.

Arch 426 Experimental Stress Analysis (3)

Stress determination by model analysis. Brittle coatings, photoelastic methods and strain gauges. Advanced topics. 2 lectures, 1 laboratory. Prerequisite: Arch 444

Arch 441, 442, 443 Professional Practice (2) (2) (2)

Comprehensive projects in architecture involving office organization. Contract documents. Ethics. Drawings for buildings with coordinated engineering and specifications. Field trips. 2 activities. Prerequisite: Arch 306, 343

Arch 444, 445, 446 Structural Design (5) (5) (5)

Stress analysis of long-span structures, arches, influence lines, built-up girders, multiple-storied rigid frame structures, prestressed concrete, shells and domes. Dams and bridges. Advanced topics from current engineering practice. One designated field trip required. 5 laboratories. Prerequisite: Arch 306, 316, 343, 344; Math 204, 241

Arch 447, 448, 449 Design for Planners (2) (2) (2)

Continuation of Arch 347, 348, 349 dealing with problems of increasing size and complexity. 2 laboratories. Prerequisite: Arch 349

Arch 451 Architectural Design (5)

Continuation of Arch 353. Problems of increasing architectural complexity with emphasis placed on comprehensive solutions. 5 laboratories. 15 units required, no more than 5 units per quarter. Prerequisite: Arch 306, 343, 353

Arch 458 Computer Applications in Spatial Design (2)

Organization, analysis and optimization of three dimensional spaces using digital computer. Application of logic to spatial design decisions. Use of problem oriented languages and survey of current field applications. 2 activities. Prerequisite: Math 143, Arch 250, 4th year standing.

Arch 461, 462 Senior Project (2) (2)

Selection and completion of a comprehensive type project under faculty supervision. Problems to involve the students' technical and creative skills. Construction encouraged. 120 hours minimum total time. Prerequisite: Arch 306, 343

Arch 463 Undergraduate Seminar (2)

Discussion and lectures on problems of practice and the building industry. Professional ethics. Students present organized material on some subject of interest in architectural engineering or architecture. 2 activities. Prerequisite: Senior standing

Arch 465 Housing Seminar (3)

Survey of urban housing in the industrial age; qualitative analysis of aspects of planning the individual unit and the position of housing units within the urban fabric; problems of housing rehabilitation; investigation of criteria for programming housing; examination of organizational forms of housing; housing needs in various population groups. 3 lectures. Prerequisite: Soc 313 and 4th year standing.

Architecture/Art

Arch 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

Arch 523 Urban Design Analysis (3)

Analysis of cities based on visual design excellence. Compositional qualities of form, space, light, materials and color. Spatial sequencing and imageability qualities. 1 lecture, 2 laboratories.

Arch 551 Architectural Design (5)

Continuation of Arch 451. Stressing professional initiative and responsibility in integrating architectural design theory and practice with fields influencing the shaping of the total environment. 5 laboratories. 15 units required, no more than 5 units per quarter. Prerequisite: Arch 406, 443, CRP 243, and 15 units of Arch 451

Arch 571, 572, 573 Design Project (2) (2) (2)

A comprehensive architectural design project chosen by the student which will challenge his technical, creative and organizational abilities. Project to involve community or field contact on a team basis. Construction or projects involving other disciplines encouraged. 2 laboratories. Concurrent: Arch 551



ART

Art 201, 202 Fundamentals of Drawing (3) (2)

Analysis and practice in functional drawing, basic design, and study of form. Development of individual techniques. 3 or 2 activity periods.

Art 211, 212 Art History (3) (3)

The chronological study of the significant art and artists in world history. In addition to painting and sculpture, considerable emphasis will be given to the applied arts of each period. 3 lectures.

Art 214, 215, 216 Art in Civilization (1) (1) (1)

An integration of art within the framework of ideas or chronology of a selected course in the humanities. 1 lecture. Concurrent enrollment in Hist 101, 102, 103 required.

Art 221, 222, 223 Design Fundamentals (3) (3) (3)

Exploration of basic graphic design theory and practice. Two dimensional concepts, three dimensional concepts, and color concepts introduced in successive quarters. 3 activities.

Art 231 Introduction to Art (3)

Designed to further understanding of painting, sculpture and graphic arts. Development of vocabulary and useful criteria for evaluation. 3 lectures.

Art 232 Orientation to Art Materials, (3)

Manipulation and experimentation with a wide variety of art media and techniques. Evaluation of expressive and design qualities in group and individual projects. 3 activity periods.

Art 233 Orientation to Crafts (3)

Basic experiences in three dimensional processes in contemporary crafts with the materials of clay, glass, metal, wood and leather. Emphasis on design as presented through materials and their properties. 3 activity periods.

Art 255 Functions of Design (2)

Survey of design in areas pertinent to the environment. Lecture-discussion related to current design trends. Involvement of the individual in his environment. 2 lectures.

Art 314 American Art (2)

Development of art in any one or more of the ethnic groups or cultures within the western hemisphere. Course will bear a descriptive subtitle. 2 lectures. May be repeated to a total of 6 units. Prerequisite: Art 211, 212 or permission of the instructor.

Art 316 Non-Western Art (2)

Development of art in any one or more of the non-western ethnic groups or cultures. Course will bear a descriptive subtitle. 2 lectures. May be repeated to a total of 6 units. Prerequisite: Art 211 or 212 or permission of the instructor.

Art 321 Applied Color and Design (3)

Study of lines, planes, masses, textures, color, and aspects of space as elements in the structure of the plastic arts. Balance, rhythm, and proportion of any two or more of these elements as utilized in the fine and applied arts. Experience in simple media. 2 lectures, 1 activity period. Prerequisite: Art 231 or consent of instructor.

Art 324, 325, 326 Advanced Crafts (2) (2) (2)

Applied principles of general design and color theory in ceramics, metal work, textile design, simple woodworking, and other craft materials. Emphasis on skill development, material handling, and current methods of applied design. 2 activities. Prerequisite: Art 233 or 321, or consent of instructor.

Art 331, 332, 333 Applied Design (3) (3) (3)

Investigation and experimentation in art structure, color and design. Relation of aesthetic concepts to practical two and three dimensional problems in advertising, packaging, display and exhibits. Lettering skill will be emphasized. 3 laboratories. Prerequisite: Art 223 or permission of the instructor.

Art 340, 341 Painting Techniques (2) (2)

Physical characteristics of painting media, creative understanding of pictorial space and color. 2 laboratories. Prerequisite: Art 321, 345, or consent of instructor.

Art 345 Advanced Drawing (3)

Development of methods and techniques in the figurative study of form and structure. Emphasis on relating drawing to individual solutions of problems. 3 activities. Prerequisite: Art 201 and consent of instructor.

Art/Astronomy

Art 347 Sculpture (2)

Introduction to the elements of three dimensional form through the exploration of sculptural techniques. Technical problems in modeling, casting, carving, welding, and other techniques of assembly. 2 activities.

Art 348 Metalsmithing (3)

Experience in design and creation of jewelry, small sculpture and hollowware. Classroom work in copper, brass, silver and gold includes cutting, forming, joining, embellishing and casting techniques. 3 activities. Prerequisite: Art 233 and consent of instructor.

Art 349 Ceramics (3)

Introduction to ceramic materials and processes; design, slab, coil and wheel forming, glazing; related instruction and evaluation. 3 activities. Prerequisite: Art 233 or consent of instructor.

Art 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Senior standing and consent of instructor.

Art 421 Curriculum and Instructional Procedures in Art (3)

Content, organization and scope of art curriculum in elementary and secondary schools. Evaluation of teaching approaches and procedures that encourage creativity in the arts. 3 lectures.

Art 425 Contemporary Art (3)

Artists and art movements of the modern era with an emphasis on the 20th century. Prerequisite: Junior or senior standing.

Art 431, 432, 433 Graphic Design (3) (3) (3)

Laboratory problems in practical advertising design with emphasis on mass media, page layout, and related areas. Contemporary trends in graphic design. 3 laboratories. Prerequisite: Art 333 or permission of the instructor.

Art 446 Advanced Ceramics (3)

Advanced clay construction, decorating, glazing and firing with emphasis on the use of the potter's wheel. Development of appropriate design. Ceramic theory as a basis for criticism. 3 activities. Prerequisite: Art 349

Art 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

ASTRONOMY

Astr 101 Elementary Astronomy (3)

Descriptive astronomical properties of the earth, solar system, stars and galaxies. Opportunities for descriptive observations and star identification. Not open to students who have completed former PSc 321, 311 or 312. 3 lectures.

Astr 311 The Solar System (4)

Quantitative and descriptive properties of the solar system including properties of the planets and possible origins of solar system. 3 lectures, 1 laboratory. Prerequisite: Phys 132; Phys 211 strongly recommended.

Astr 312 Stars and Galaxies (4)

Quantitative and descriptive properties of the stars and galaxies including stellar structure and evolution, structure and make-up of our galaxy and the universe. 3 lectures, 1 laboratory. Prerequisite: Phys 132; Phys 211 strongly recommended.

BACTERIOLOGY

Bact 221 General Bacteriology (4)

Morphology, metabolism, classification and identification; bacteriology of air, soil, water, and foods with applications to industry, agriculture, medicine, and public health. 2 lectures, 2 laboratories. Prerequisite: One quarter of college chemistry or Bot 121 or Zoo 131

Bact 322 Dairy Bacteriology (4)

Advanced course for practical work demonstrating the domestic and industrial importance of micro-organisms involved in milk and dairy products: milk, milk powders, fermented milks, evaporated and condensed milks, butter, cheese, cheese starters, and ice cream. 2 lectures, 2 laboratories. Prerequisite: Bact 221

Bact 333 Industrial Microbiology (4)

Sanitary and industrial applications of microbiology stressing food, dairy, water, air and sewage; practical aspects of environmental sanitation emphasized. 2 lectures, 2 laboratories. Prerequisite: Bact 221

Bact 342 Sanitary Inspection and Control (2)

Domestic and commercial contamination, epidemiology, stressing practical applications of hygienic practices and methods of correcting and eliminating health hazards. 2 laboratories. Prerequisite: Bact 221

Bact 402 General Virology (3)

Characteristics and classification of animal viruses. Methods for collection of specimens, cultivation and identification of pathogenic viruses. 3 lectures. Prerequisite: Bact 221

Bact 421 Food Microbiology (4)

Physiological activities of microorganisms involved in the preparation, preservation, deterioration and toxicity of foods and related products. Sanitary and public health implications. 2 lectures, 2 laboratories. Prerequisite: Bact 221. Recommended: Chem 226

Bact 423 Public Health Microbiology (4)

Detailed study of pathogenic yeasts, molds, viruses, and bacteria in relation to public health. 2 lectures, 2 laboratories. Prerequisite: Bact 221

Bact 424 Bacterial Cytology and Physiology (4)

Cellular structure and life processes of bacteria; chemical composition, growth and metabolism. General biological implications. 3 lectures, 1 laboratory. Prerequisite: Bact 221, Chem 226. Recommended: Chem 328

Bact 436 Marine Microbiology (4)

Harmful and beneficial marine bacteria and allied microorganisms. Role played by marine microorganisms as biochemical, geological and hydrobiological agents. 2 lectures, 2 laboratories. Prerequisite: Bact 221

Bact 590 Seminar in Bacteriology (1)

Problems and topics in advanced bacteriology selected according to the interest and needs of the students enrolled. Maximum of 3 units. Prerequisite: Graduate status and evidence of satisfactory preparation in bacteriology.

BIOLOGY

Bio 100 Agricultural Biology (3)

Basic biological principles applied to agriculture. This course may not be substituted for General Zoology or General Botany. 2 lectures, 1 demonstration and discussion hour. Not open to degree students for degree credit.

Biology

Bio 101 General Biology (3)

Principles of cellular biology, heredity, ecology, and evolution, with emphasis on their relationship to human affairs. Not open to students who have completed Bot 121 or Zoo 131. 3 lectures.

Bio 102 Plant Biology (3)

Structural and functional aspects of plants, with emphasis on seed producers. Not open to students who have completed Bot 121. 3 lectures. Prerequisite: Bio 101

Bio 103 Animal Biology (3)

Structural and functional aspects of animals, with emphasis on man. Not open to students who have completed Zoo 131. 3 lectures. Prerequisite: Bio 101

Bio 127 Natural History (3)

Scope of natural history; formation and identification of features in the physical environment; natural history survey of arachnids, myriapods, and insects. 1 lecture, 2 laboratories.

Bio 128 Natural History (3)

Natural history survey of the plant and animal kingdom; field study and identification of marine intertidal organisms. 1 lecture, 2 laboratories.

Bio 129 Natural History (3)

Principles of field biology and ecology; laboratory and field study of wildflowers, land communities, and freshwater communities; emphasis is on California natural history. 1 lecture, 2 laboratories. Prerequisite: Bio 128

Bio 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Bio 255 Microtechnique (2)

Methods of preparing plant and animal tissues for microscopic study with emphasis on paraffin embedding techniques and staining. 2 laboratories. Prerequisite: Bot 122 or Zoo 132

Bio 301 Human Ecology (3)

Examination of the ways in which man is dependent on his environment, his ability to modify it, and the results of such modification. 3 lectures. Prerequisite: One quarter of biological science.

Bio 303 Genetics (3)

Principles of heredity and variation. 3 lectures. Prerequisite: one quarter of college biology and one quarter of college mathematics.

Bio 304 Advanced Genetics (2)

Recent advances in genetics and cytogenetics. 2 lectures. Prerequisite: Bio 303

Bio 313 Radiation Biology (2)

Interaction and effect of radiation on living cells and organisms. Review of production and characteristics of non-ionizing and ionizing radiation, isotope characteristics useful in the study of bio-systems, health hazards, and health safety problems. 2 lectures. Prerequisite: Phys 123, Chem 121 or 124 and one of the following: Bio 101, 110, Bot 121, Zoo 131

Bio 315 Evolution (2)

Modern concepts of evolutionary mechanisms. 2 lectures. Prerequisite: Bio 303

Bio 321 Biological Instrumentation (3)

Theory and operation of instruments commonly used in biological investigation. 1 lecture, 2 laboratories. Prerequisite: Bot 121, Zoo 131 or Bio 129

Bio 325 General Ecology (3)

Study of the interrelationships between plants and animals and their environment in terrestrial, marine, and freshwater situations. 2 lectures, 1 laboratory. Prerequisite: Bio 129 or both Bot 122 and Zoo 132

Bio 328 Marine Biology (4)

Biological and environmental studies of marine organisms, with emphasis on their economic importance. 2 lectures, 2 laboratories. Prerequisite: Bio 129 or both Bot 122 and Zoo 133, or consent of instructor.

Bio 331 Biosystematics (3)

Major principles of classification, taxonomy, speciation, and nomenclature. Designed primarily for biology majors. Term report required. 2 lectures, 1 laboratory. Prerequisite: Ent 126, Bio 129 or both Bot 123 and Zoo 133

Bio 343 Radiation Laboratory Techniques (2)

Demonstrations and exercises in the use of radioisotopes and the operation of radiation detecting instruments. 2 laboratories. Prerequisite: Bio 313 (may be taken concurrently).

Bio 344 Genetics Laboratory (2)

Laboratory techniques in genetics. 2 laboratories. Prerequisite: Bio 303

Bio 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

Bio 423 General Cytology (4)

Detailed study of the structure and function of animal and plant cells. 3 lectures, 1 laboratory. Prerequisite: Bio 303 and either Zoo 133 or Bot 123

Bio 424 Electron Microscopy (3)

Biological applications of electron microscopy including techniques of specimen preparation, design of experiments, interpretation of results and limitations. 1 lecture, 2 laboratories. Prerequisite: Zoo 131, Bot 121 or instructor's consent.

Bio 431 General Physiology (4)

The functioning, control, and integration of physiological phenomena at various levels from cell to organism. 2 lectures, 2 laboratories. Prerequisite: Chem 226; Bot 122 or Zoo 132

Bio 437 Marine Resources (4)

Present and potential biological and physical resources of the sea with consideration of means for their best utilization. Identification and ecology of pertinent organisms. 3 lectures, 1 laboratory. Prerequisite: Bot 122 and Zoo 133

Bio 442 Quantitative Biology (4)

Design of biological experiments with emphasis on sampling methods, data collection, mensuration, and analysis of field and laboratory data. 3 lectures, 1 laboratory. Prerequisite: One year of biology and Stat 212 or 321

Bio 461, 462 Senior Project (2) (2)

Projects are selected from typical problems which graduates may meet in areas of their future employment. Results are presented in both oral and written reports. Minimum 120 hours total time.

Bio 463 Undergraduate Seminar (2)

Study and discussion of recent developments in the field of biology. 2 meetings. Prerequisite: Senior standing.

Biology/Botany

Bio 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

Bio 500 Individual Study (1-3)

Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Enrollment by petition. Prerequisite: Graduate standing and consent of instructor.

Bio 515 History of Biology (3)

Critical survey of the historical development of experimental designs for the solution of biological problems. 3 lectures. Prerequisite: Graduate standing.

Bio 521 Curriculum and Methods in Biological Sciences (3)

Objectives, content, techniques, materials, and recent trends of successful instruction in secondary school biology. 3 lectures. Prerequisite: Graduate standing; evidence of satisfactory preparation in biology, botany and zoology.

Bio 524 Developmental Biology (3)

Developmental phenomena of higher and lower plants, vertebrate and invertebrate animals at the molecular, cellular, histological and organ levels. Each quarter will emphasize a different biological description. 3 units per quarter. May be repeated to a maximum of 9 units. 2 lectures, 1 laboratory. Prerequisite: Graduate standing and evidence of satisfactory preparation in biology.

Bio 527 Cell Physiology (4)

Functional organization of cells, their environment, and energy metabolism. Laboratory exercises in dynamic aspects of cell physiology. 2 lectures, 2 laboratories. Prerequisite: Graduate standing and Chem 328, Math 114, Bio 431

Bio 535 Bioanalysis (3)

Clinical aspects of hematology, serology, immunology, parasitology, and clinical chemistry. Preparation of bio-technologists for state examinations and clinical and industrial laboratory work. 2 lectures, 1 laboratory.

Bio 590 Seminar in Biology (1)

Problems and topics in advanced biology selected according to the interest and needs of the students enrolled. Maximum of 3 units. 1 lecture. Prerequisite: Graduate status and evidence of satisfactory preparation in biology.

Bio 599 Thesis (3) (3) (3)

Individual research under the general supervision of the staff, leading to a graduate thesis of suitable quality. Prerequisite: Graduate standing and consent of instructor.

BOTANY

Bot 121 General Botany (4)

Introduction to structures and functions of seedbearing plants. 2 lectures, 2 laboratories.

Bot 122 General Botany (4)

Structure and relationships of plant groups from bacteria to angiosperms, emphasis on nonseedbearing plants of economic importance. 2 lectures, 2 laboratories. Prerequisite: Bot 121

Bot 123 General Botany (4)

Introduction to classification and identification of vascular plants, emphasizing the families of major economic importance; field and herbarium techniques. 2 lectures, 2 laboratories. Prerequisite: Bot 121

Bot 238 Native Plant Materials (3)

Identification, habits of growth, cultural requirements and landscape use of native California plants suitable for landscape purposes. 2 lectures, 1 laboratory. Prerequisite: Bot 123

Bot 322 Introductory Plant Physiology (4)

A consideration of the principal physiological processes of plants including water relations, mineral nutrition, photosynthesis, respiration, and growth of the plant. 3 lectures, 1 laboratory. Prerequisite: Bot 121 and Chem 226

Bot 323 Plant Pathology (4)

Comprehensive study of the causes and effects of disease in plants. Designed to lead to an understanding of the science and modern control methods. 2 lectures, 2 laboratories. Prerequisite: Bot 122 or Bot 123

Bot 325 Plant Nematology (4)

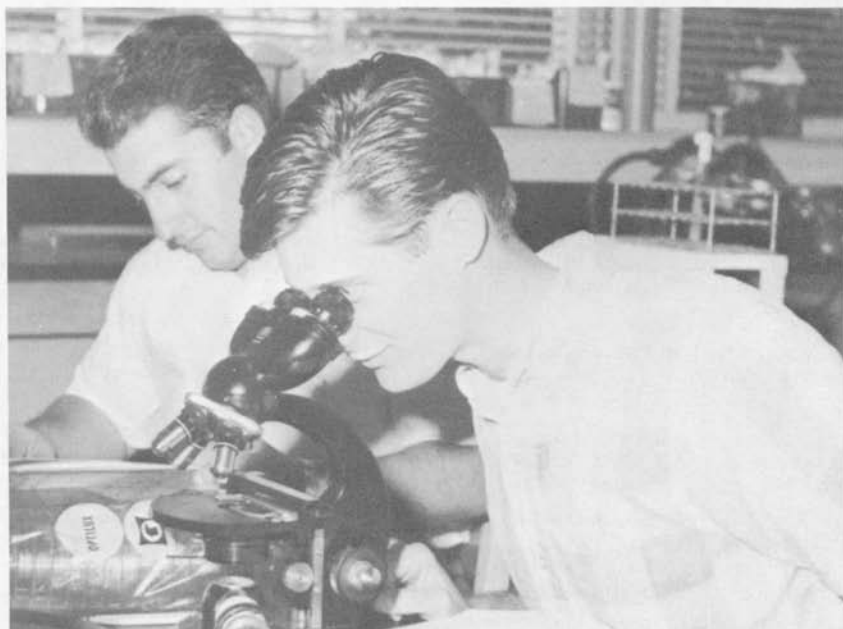
Plant parasitic nematodes, their morphology, classification, and the damage they cause plants, alone or in combination with other pathogens. 2 lectures, 2 laboratories. Prerequisite: Bot 323, Ent 126

Bot 326 Plant Ecology (4)

Effects on plant growth and development of the following environmental factors: soil, water, temperature, light, atmosphere, topography, organisms, and fire. 3 lectures, 1 laboratory. Prerequisite: Bot 123

Bot 334 Morphology of Vascular Plants (4)

Phylogenetic relationships of the plant kingdom as illustrated by comparative morphology of the vascular plants including living and fossil forms. 2 lectures, 2 laboratories. Prerequisite: Bot 123



Bot 335 Plant Anatomy (4)

Microscopic study of vascular plants dealing with the origin, development and structure of cells, tissues and organs. 2 lectures, 2 laboratories. Prerequisite: Bot 122

Botany/Business

Bot 337 Algae (4)

Classification of marine and fresh-water algae. Consideration of ecological, physiological and economic aspects. 2 lectures, 2 laboratories. Prerequisite: Bot 122

Bot 343 Advanced Plant Taxonomy (3)

Systems of plant classification and principles on which they are based; use of morphology, cytogenetics, and ecology in classification; rules of botanical nomenclature. 2 lectures, 1 laboratory. Prerequisite: Bot 123

Bot 425 Plant Virology (4)

Plant pathogenic viruses, their plant, insect, nematode and fungal host-pathogen relationships, symptom recognition, isolation and identification methods. 2 lectures, 2 laboratories. Prerequisite: Bot 323, Ent 227

Bot 426 Mycology (4)

Comparative morphology and nuclear behavior of the fungi. A summary of the science with special attention given to forms important in agriculture, medicine and industry. 2 lectures, 2 laboratories. Prerequisite: Bot 122, Zoo 132, or consent of instructor.

Bot 433 Advanced Plant Physiology (4)

Advanced topics in plant physiology. Substructure and function of plant cell walls; cell walls as barriers against infection, plant cell enzymes and cell membranes, plant metabolism, cell wall extension, pigment systems. Application of physiology to taxonomic problems and disease resistance. 2 lectures, 2 laboratories. Prerequisite: Bot 322 or equivalent.

Bot 531 Advanced Plant Pathology (4)

Relationships of plant hosts with their parasites. Methods and materials used in diagnosis of plant diseases and in plant disease research. 2 lectures, 2 laboratories. Prerequisite: Bot 323

Bot 590 Seminar in Botany (1)

Problems and topics in advanced botany selected according to the interest and needs of the students enrolled. Maximum of 3 units. 1 lecture. Prerequisite: Graduate status and evidence of satisfactory preparation in botany.

BUSINESS

Bus 101 The Business Enterprise (4)

Orientation to the Business Administration program. Examination of the business enterprise, stressing its historical, environmental, and economic setting. Business organization and functions. 4 lectures.

Bus 103 Business Reports (3)

Organization and presentation of different types of business reports, including source determination, investigation, writing, and distribution. 3 lectures.

Bus 141 Typing (1)

Designed to teach the fundamentals of the touch system in the shortest time. Training in making out business forms and writing business letters. 3 one-hour periods.

Bus 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Bus 206 Purchasing (3)

The purchasing function as it applies primarily to manufacturers, utilities and institutions. Representative cases in each major area are studied and emphasis is given to the function of the purchasing department of the company in relation to and in cooperation with other major divisions of the enterprise. 3 lectures.

Bus 301 Business Law Survey (3)

An overview of the field of business law patterned to needs of non-majors. Scope is the same as for Bus 307-308, though in less depth. 3 lectures. Not applicable for credit in Business Administration curriculum. Junior standing or consent of instructor.

Bus 307 Business Law (4)

American law sources, courts, contracts, agency, bailments, carriers, and sales law. 4 lectures. Prerequisite: Junior standing or consent of instructor.

Bus 308 Business Law (4)

Negotiable instruments, partnerships, corporations, real property, personal property, domestic relations, community property, wills and administration, trusts, insurance, suretyship, bankruptcy. 4 lectures. Prerequisite: Bus 307

Bus 319 Business Research (3)

Information gathering principles and techniques used in study and analysis of business activities. 3 lectures. Prerequisite: Stat 212 or consent of instructor.

Bus 321, 322 Business Applications of Data Processing (3) (3)

Programming the computer using current, user-oriented symbolic language appropriate to typical business applications. Systems analysis. Systems and program flow charting. Data input, storage, processing, and output media and techniques. 2 lectures, 1 two-hour laboratory. Prerequisite: CSc 100 or ability to program in COBOL; Actg 131 or 221 or consent of instructor.

Bus 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Senior standing or consent of instructor.

Bus 404 Business and Government (3)

Development of legal controls of business, with emphasis on problems in constitutional and administrative area; legal aspects of business organization; anti-trust laws and competition; securities regulation; consumer protection. 3 lectures. Prerequisite: Bus 301 or 307 or consent of instructor.

Bus 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Formal report is required. Required minimum of 120 hours.

Bus 463 Undergraduate Seminar (2)

Seminar in developments in business with emphasis on business ethics and morals. 2 meetings. Prerequisite: Senior standing or special permission.

Bus 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

BUSINESS ADMINISTRATION

BA 500 Independent Study (1-3)

Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Enrollment by petition. Prerequisite: Consent of the department head.

BA 501 Accounting for Planning and Control (3)

Application of accounting to management planning, control and information systems. Case and problem analysis in budgetary control, standard and direct costing, decentralized profit control, inter-division transfers, and long-range planning. 3 lectures. Prerequisite: BA 510 or equivalent.

Business Administration

BA 506 Business and Society (3)

Modern business organization as a quasi-economic, legal-social entity including examination of widely held views, philosophical and ethical considerations, conceptual foundations, and customer-employee-government-stockholders-public interrelationships. 3 lectures. Prerequisite: Bus 301 or equivalent.

BA 508 Marketing Management I (3)

Detailed analysis of marketing management, policy planning or strategy formulation, organizing, directing and coordinating marketing activities. 3 lectures. Prerequisite: Mktg 204 or equivalent.

BA 509 Marketing Management II (3)

Application of quantitative and qualitative tools, introduced in previous quarters of the integrated program, to marketing problems. 3 lectures. Prerequisite: BA 508 or consent of instructor.

BA 510 Foundations in Accounting (4)

Principles and practices of fundamental accounting. Introduction to cost accounting and financial statement analysis. 4 lectures. Prerequisite: Graduate standing.

BA 511 Micro-Economics (3)

Analysis of production, demand, supply, costs, market structures, factor pricing, and policy decision making by business firms and consumers. 3 lectures. Prerequisite: Ec 212 or equivalent.

BA 512 Macro-Economics (3)

Analysis of aggregative economics. Theories of income, output, employment; growth of the economy; economic policies. 3 lectures. Prerequisite: Ec 212 or equivalent.

BA 513 Operations Management (3)

Application of analytical tools to problems in operations and production systems. Emphasis on models and techniques in operations planning and control and systems design for management. 3 lectures. Prerequisite: BA 527 or equivalent.

BA 518 Labor Relations in the Public Sector (3)

History of labor relations at the federal-state-local level. Comparative relations between union organizations, policies, and practices within the public and private sectors. Emphasis will be placed on current issues. 3 lectures. Prerequisite: BA 584 or consent of instructor.

BA 520 Foundations in Finance (2)

Problems of financing current and fixed assets from internal and external sources. Emphasis on analysis, planning and control. 2 lectures. Prerequisite: Graduate standing.

BA 522 Money and Capital Markets

Capital markets and non-bank financial intermediaries. Factors that affect supply, demand, and interest rates in these markets. 3 lectures. Prerequisite: BA 511 or consent of instructor.

BA 525 Business Finance (3)

Complex issues and models related to financial management and policy. Problems in capital budgeting, optimal financial structure, working capital management, and financing dynamic growth; case analysis and simulation to correlate theory and application. 3 lectures. Prerequisite: BA 501 and 511 or equivalent.

BA 527 Quantitative Methods I (3)

Applications of mathematical and statistical techniques to business and economic problems of broad significance to management. Case analysis and numerical solution by computer. 3 lectures. Prerequisite: Math 540 and Stat 540 or equivalent and consent of instructor.

BA 528 Quantitative Methods II (3)

Additional specialized business problems. Optimization of probabilistic processes and analysis of risky decisions using appropriate mathematical and statistical techniques. Case analysis, numerical solution and simulation by computer. 3 lectures. Prerequisite: BA 527 or equivalent and consent of instructor.

BA 530 Foundations for Management (3)

Examination of major theories and conceptual ideas relating to the nature and behavior of formal organizations; historical development of organizational theory and structure. Current issues. 3 lectures. Prerequisite: Graduate standing.

BA 581, 582, 583 Seminar in Applied Decision Making (4) (4) (4)

Problem definition and management decision making. Case analysis, demonstrations, simulations, role playing, and management games aimed at integrating and synthesizing material in the graduate curriculum. Application of analytical tools. Human resources implications. Dynamic functional and environmental factors. 4 meetings. Prerequisite: Graduate standing.

BA 584 Seminar in Human Resources Management (3)

Class discussion and selected readings relating to the management of people in organizations. Manpower policy, behavioral science research, utilization of minority and hard-core personnel, industrial relations ramifications. 3 meetings. Prerequisite: BA 530 or equivalent.

CHEMISTRY

Chem 106 Introductory Chemistry (3)

Metric system, density, chemical symbols, chemical formulas, nomenclature, kinetic-molecular theory, chemical equations, gas laws, the concept of the mole, molarity, normality and stoichiometric calculations. An introductory course in chemistry, not open to students who have credit for a college chemistry course. 3 lectures. Prerequisite: Math 103 or equivalent.

Chem 121 General Inorganic Chemistry (4)

Fundamental principles including atomic structure, bonding, nomenclature, chemical equations, states of matter, solutions, some non-metals. Not open to students with credit for Chem 124. 3 lectures, 1 laboratory. Prerequisite: Chem 106 or recommendation of faculty adviser.

Chem 122 General Inorganic Chemistry (4)

Electrochemistry, equilibria, non-metals with application to fertilizers, colloids, an introduction to metals and nuclear chemistry. Not open to students with credit for Chem 125. 3 lectures, 1 laboratory. Prerequisite: Chem 121

Chem 124 General Chemistry (4)

General principles including atomic structure, nuclear chemistry, and oxidation-reduction. Primarily for engineering majors. Not open to students with credit for Chem 121. 3 lectures, 1 laboratory. Prerequisite: Chem 106 or recommendation of faculty adviser.

Chem 125 General Chemistry (4)

Continuation of Chem 124. Introduction to the carbon compounds emphasizing fuels and synthetic polymers. Not open to students with credit for Chem 122. 3 lectures, 1 laboratory. Prerequisite: Chem 124

Chem 126 General Chemistry (4)

Chemical equilibria, compounds of the metals, qualitative analysis of the metal ions in the laboratory. 3 lectures, 1 laboratory. Prerequisite: Chem 122 or 125

Chem 143 General Chemistry Laboratory (1)

Additional laboratory to be taken with Chem 126. Includes semi-micro qualitative study of the nonmetals. 1 laboratory. Prerequisite: Chem 122 or 125

Chemistry

Chem 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Chem 226 Organic Chemistry (4)

The fundamental concepts of organic chemistry with applications to agricultural and industrial processes. 3 lectures, 1 laboratory. Prerequisite: Chem 122 or 125

Chem 305 Physical Chemistry (3)

Physical and molecular constitution of gases; kinetic theory; atomic structure; elementary chemical thermodynamics and thermochemistry; chemical statistics; introduction to phase equilibria. 3 lectures. Prerequisite: Phys 123 or 133, Chem 126, Math 141

Chem 306 Physical Chemistry (3)

Phase equilibria, solutions; distillation theory; colligative properties; electrochemistry with analytical applications; non-ideal systems, chemical kinetics, radioactivity. 3 lectures. Prerequisite: Chem 305

Chem 313 Chemical Process Principles (3)

Fundamental terms, concepts, and principles used in the chemical processing industries. 3 lectures. Prerequisite: Chem 226 or consent of the instructor.

Chem 327 Organic Chemistry (5)

A more complete study of the types of organic compounds along with some reaction mechanisms. The laboratory is largely organic preparation. 3 lectures, 2 laboratories. Prerequisite: Chem 226

Chem 328 Biochemistry (4)

Fundamental chemistry of carbohydrates, proteins, fats, vitamins, enzymes and hormones as applied to their function in plant and animal metabolism. Special reference to the chemistry involved in the use, analysis and manufacture of feeds, foods and other agricultural products. 3 lectures, 1 laboratory. Prerequisite: Chem 226

Chem 329 Biochemistry (4)

Applied cellular biochemistry, nucleic acids, protein synthesis, virus, molecular geometry, antimetabolites, antibiotics, hormones, pharmacodynamics and laboratory animal techniques. 3 lectures, 1 laboratory. Prerequisite: Chem 328

Chem 331 Quantitative Analysis (4)

Analytical techniques of industrial significance stressing titrimetric procedures in the laboratory based on acidimetry, alkalimetry and redoximetry. Applications of chemical equilibrium and methods of problem solving. 2 lectures, 2 laboratories. Prerequisite: Chem 126

Chem 332 Quantitative Analysis (4)

Analytical techniques stressing procedures based upon titrimetric precipitometry, gravimetric analysis and continuation of redoximetry. Properties of precipitates and colloids as applied to industrial analytical chemistry. 2 lectures, 2 laboratories. Prerequisite: Chem 331

Chem 335 Quantitative Physiological Chemistry (3)

Quantitative determination of metabolites in biological fluids. Medical laboratory techniques in analysis of serum, blood and urine for glucose, nitrogenous substances, electrolytes, hormones, enzymes; blood gas analysis and blood pH determination. 1 lecture, 2 laboratories. Prerequisite: Chem 328

Chem 337 Biophysical Chemistry (4)

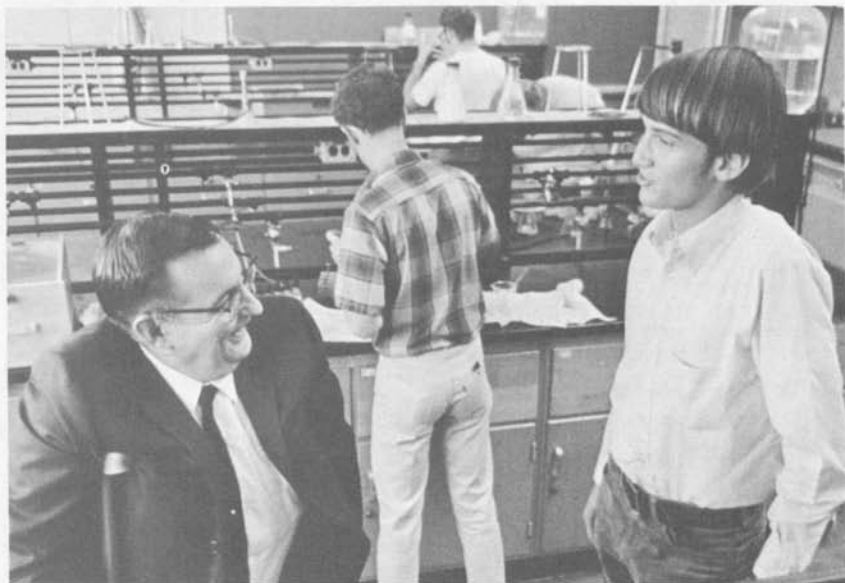
Physical methods for studying biological systems. A study of biopolymers and cellular organelles based on bioenergetics. 3 lectures, 1 laboratory. Prerequisite: Phys 123, Chem 328, 331

Chem 338 Organic Chemistry (5)

A continuation of Chem 327, including carbohydrates, sulfur compounds, heterocyclic compounds, natural products, stereochemistry, steroids, reaction mechanisms, organic preparations in the laboratory. 3 lectures, 2 laboratories. Prerequisite: Chem 327

Chem 342 Laboratory Glassblowing (1)

Techniques of glassblowing applied to the making of simple laboratory apparatus. 1 laboratory. Prerequisite: Chem 121 or 124

**Chem 343 Qualitative Organic Analysis (4)**

The experimental determination of the identity of organic compounds. Special reference to those compounds used in agriculture. 1 lecture, 3 laboratories. Prerequisite: Chem 327

Chem 355 Physical Chemistry Laboratory (1)

Experimental studies of gases, solutions, thermochemistry and chemical equilibria. 1 laboratory. Corequisite: Chem 305

Chem 356 Physical Chemistry Laboratory (1)

Experimental studies of phase rule, electrochemistry and chemical kinetics. 1 laboratory. Corequisite: Chem 306

Chem 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

Chem 402 Inorganic Chemistry (3)

A systematic study of important elements based on periodic grouping and atomic structure with emphasis on chemical bonding, coordination compounds, and acid-base relationships. 3 lectures. Prerequisite: Chem 306 or permission of instructor.

Chem 403 Advanced Organic Chemistry (3)

A detailed study of the mechanisms of organic reactions and related topics. 3 lectures. Prerequisite: Chem 327, 305 or permission of instructor.

Chemistry

Chem 415 Advanced Physical Chemistry I (3)

Chemical structure. Fundamentals of quantum chemistry, spectroscopy, and the electronic structure of atoms and molecules. Contemporary bonding theories. 3 lectures. Prerequisite: Chem 437

Chem 416 Advanced Physical Chemistry II (3)

Molecular spectra, magnetic resonance spectra, statistical thermodynamics and applications, chemical kinetics and rate theory, advanced electrochemistry. 3 lectures. Prerequisite: Chem 415

Chem 428 Biomacromolecules (4)

Cell growth, differentiation, and control. Biochemical genetics, genetic code, protein synthesis and conformation. Physical methods for enzyme systems. 3 lectures, 1 laboratory. Prerequisite: Chem 329

Chem 434 Advanced Biochemistry (4)

Intermediary metabolism, hereditary molecular diseases, enzyme kinetics, bioenergetics, photosynthesis. Agricultural and industrial applications. 3 lectures, 1 laboratory. Prerequisite: Chem 329

Chem 435 Food Analysis (4)

Techniques used commercially in the chemical analysis of seed and cereal crops, fruit and vegetable crops, forage crops, meat and meat products, milk and dairy products, eggs and poultry products. Vitamin determinations, microbiological assay, quality control, taste testing, legal specifications, grading and labeling. 3 lectures, 1 laboratory. Prerequisite: Chem 328

Chem 436 Agricultural Chemicals (4)

Chemistry of fungicides, insecticides, rodenticides, plant growth regulators, soil conditioners, and fertilizers. Special reference to the analysis, manufacture, toxicology, legal specification, and regulations. 3 lectures, 1 laboratory. Prerequisite: Chem 328

Chem 437 Physical Chemistry (4)

Physical chemistry of the liquid and solid states. Chemical bonding and molecular structure; spectroscopy, diffraction, electrical and magnetic properties of molecules. Surface chemistry and catalysis. 3 lectures, 1 laboratory. Prerequisite: Chem 306 and 356 or consent of instructor.

Chem 439 Instrumental Analysis (4)

Optical, electroanalytical and other techniques of modern instrumental analysis. Current industrial applications. Laboratory work in instrumental methods is emphasized. 2 lectures, 2 laboratories. Prerequisite: Chem 331, 306, and 356

Chem 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

Chem 463 Undergraduate Seminar (2)

Oral presentations of current developments in chemistry based on periodical literature. 2 meetings.

Chem 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Chem 305, 327 or consent of instructor.

Chem 513 Advanced Inorganic Chemistry (3)

Selected topics concerning the structures and related properties of inorganic compounds. 3 lectures. Prerequisite: Graduate standing.

CHILD DEVELOPMENT

CD 103 The Beginning Family (3)

Relationships and adjustments in family living with emphasis on the beginning stage of the family life cycle. For both men and women. 3 lectures.

CD 108 Child, Family, and Community (3)

Influence of family, society, and cultural forces on behavior of children. Role of parents, teachers, and professional workers on the healthy personality development of the child. Field trips and home visits required. 3 lectures.

CD 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

CD 222 Family and Community Health (2)

Principles in individual, family, and community health related to psychology, physiology, sociology, and economics. 2 lectures. Prerequisite: Sophomore standing.

CD 232 Child Development—Infancy (3)

Basic principles of development. Growth and development from conception through infancy. Characteristic behavior patterns of the young child in relation to environment. Field trips and observations required. 3 lectures. Prerequisite: Psy 202, CD 103

CD 233 Child Development—Preschool Years (3)

Development and behavior of the preschool child on the basis of current knowledge in child development. Intellectual, physical, emotional, social, and moral development of the preschool child. Controlled observations in the laboratory nursery school. 3 lectures. Prerequisite: Psy 202, CD 103

CD 301 Afro-American Pre-School Child (3)

Cultural and environmental factors that influence the growth and development of the pre-school Afro-American child. Field trips are required. 3 lectures. Prerequisite: Sophomore standing.

CD 302 Mexican-American Pre-School Child (3)

Cultural and environmental factors that influence the growth and development of the pre-school Mexican-American child. Field trips are required. 3 lectures. Prerequisite: Sophomore standing.

CD 313 Parent-Child Relationship (3)

Nature, influence and causes of parent behavior; home-school interaction, programs and evaluation. 3 lectures. Prerequisite: CD 319, 320 and consent of instructor.

CD 319 Programs for Young Children (3)

Theories of play, creativity, and concept development as they relate to programs for young children. 3 lectures. Concurrent with CD 320. Prerequisite: CD 232, 233

CD 320 Laboratory Study of Young Children (3)

Understanding the principles of behavior and development as implemented in a child development laboratory. 1 lecture, 2 laboratories. Concurrent with CD 319

CD 403 Directed Nursery School and Community Experience (6)

Directed work in a nursery school or community facility. Consultation with college supervisors. Prerequisite: CD 313

Child Development/City Planning

CD 404 Administration of Child Development Centers (3)

Preparation for administering child development centers. Housing and equipment, costs, staff, programs, health protection, and community relations. 3 lectures. Prerequisite: CD 319, 320

CD 405 Family Development (3)

Dynamics of family interaction at each stage of the life cycle. Emphasis on developmental tasks, socio-economic and cultural influences, and family differences. 3 lectures. Prerequisite: CD 103, 222

CD 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision, the project to be related to a probable field of employment. Results of the study are presented in a formal report. Minimum of 120 hours total time.

CD 463 Undergraduate Seminar (2)

Study and discussion of current developments in the field of child development. 2 lectures. Prerequisite: Senior standing.

CD 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

CD 533 The Child in Contemporary Culture (4)

Development of children in the home and family in relation to contemporary society. Emphasis upon research findings. Responsibility in the Child Care Laboratory and selected field experiences. 2 lectures, 2 laboratories. Prerequisite: Graduate standing or consent of instructor.

CITY AND REGIONAL PLANNING

CRP 211, 212 Introduction to Urban Environment (3) (3)

History and analysis of social and technological factors which have influenced the physical growth of cities. Philosophical approaches. Problems of growth and the development of various theories of city planning. Recommended for all majors. 3 lectures. Prerequisite: Eng 105

CRP 243 Introduction to Urban Environment (2)

Design applications of CRP 211, 212. 2 lectures. Prerequisite: CRP 212

CRP 301, 302, 303 Planning Theory (2) (2) (2)

Planning theory and related topics. Environmental engineering and public health. 2 lectures. Prerequisite: CRP 243, Arch 253

CRP 304 Zoning (2)

Zoning theory and legal background. Historical and current land districting practices. Zoning as a device to guide urban growth; the zoning ordinance, the districting plan; relationship to the general plan. Economic and social ramifications. New concepts. 2 lectures.

CRP 351, 352, 353 Planning Laboratory (4) (4) (4)

Case study application of planning theory to the community, its components, and to the city and the region. Relationships of city spaces and structures. Re-development. Field trips. Individual, team, and interdisciplinary approaches. Computer applications. 4 laboratories. Prerequisite: CRP 243, Arch 253

CRP 400 Special Problems for Advanced Undergraduates (1-2)

Individual or group investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

CRP 401, 402, 403 Planning Theory (2) (2) (2)

Advanced planning theory and related topics. Law and human ecology. 2 lectures. Prerequisite: CRP 303

CRP 411 Implementation Techniques (2)

Procedures in enlisting and sustaining community interest in city and regional plan implementation. Field trips. 2 lectures. Prerequisite: Arch 349

CRP 418 New Town Planning (2)

History, present situation and future of new town planning in the United States. Relationship to other countries. 2 lectures. Prerequisite: Arch 243

CRP 451, 452, 453 Planning Laboratory (4) (4) (4)

Continuation of CRP 351, 352, 353. 4 laboratories. Prerequisite: CRP 303, 353, Arch 349



CRP 457 Planning Information Systems (2)

Use of a problem-oriented system to retrieve statistical information pertinent in planning. 2 activities. Prerequisite: Math 211, Arch 250, 4th year standing.

CRP 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: Senior standing.

CRP 463 Undergraduate Seminar (2)

Discussion and lectures on problems of the planning field. Students to select current topics, research, organize material, arrange for exhibits, guest speakers and present topics in open meetings. 2 activities. Prerequisite: Senior standing.

CRP 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

COMPUTER SCIENCE

CSc 100 Data Processing (2)

Introduction to computer concepts and the COBOL language. Preparation of business reports with computers. Elements of computer organization and fundamentals of program writing for business oriented problems. 2 lectures.

CSc 101 Fortran Programming (1)

Emphasis on programming techniques for mathematical analysis. Business and science applications. 1 activity.

CSc 110 Computers and Computing (3)

Applications of computers in modern society. Survey of the development of the art of computing and of computing devices from ancient times to the modern digital computer. Relationship of mathematics to computing procedures. How computers are programmed. 3 lectures.

CSc 140 Business Data Processing (2)

Essentials of COBOL programming. Problem analysis, flow charting, documentation, and coding for computer execution of typical business problems. 2 lectures. Prerequisite: CSc 100

CSc 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

CSc 218 Boolean Algebra and its Applications (3)

Boolean Algebra; applications to the algebra of propositions; applications to switching, control, and computation circuits. 3 lectures.

CSc 219 Linear Programming (3)

Introduction to linear programming, the simplex and the dual problems. Use of linear programming techniques to solve scheduling problems and transportation problems. 3 lectures. Prerequisite: 6 units of college mathematics.

CSc 221 Computer Principles and Programming (3)

Organization of general purpose and special purpose digital computers, preparation of programs for general purpose computers, sub-routines. 3 lectures. Prerequisite: CSc 101 or equivalent.

CSc 222 Digital Computer Symbolic Programming (3)

Extension and amplification of language studied in CSc 221. Use of auxiliary storage, writing of subroutines, advanced programming techniques. 3 lectures. Prerequisite: CSc 221

CSc 301 Advanced Fortran Programming (2)

Programming in extended Fortran language with emphasis on program efficiency and advanced features. Comparison of Fortran implementations. 2 lectures. Prerequisite: CSc 101 and junior standing.

CSc 304 Digital Computer Programming (3)

Principles and techniques of programming for a large modern digital computer. Assembly program usage, subroutines, timing problems, and data processing. 3 lectures. Prerequisite: CSc 221 or consent of instructor.

CSc 310 Programming Language/One (PL/I) (3)

Introductory and intermediate treatment of PL/I. PL/I program formats, data forms, data transmission, internal manipulations, sequence control, and program organization. 3 lectures. Prerequisite: CSc 101 or equivalent.

CSc 331 Numerical Linear Analysis (3)

Introduction to methods currently available to engineers, scientists and mathematicians for dealing with systems of linear equations utilizing a digital computer. Solutions of systems of linear equations, calculation of matrix inverses, eigenvalues, and eigenvectors. Applications to problems in engineering and science. 3 lectures. Prerequisite: Elementary Fortran, Math 131 or 141, or consent of the instructor.

CSc 332 Introduction to Numerical Methods (3)

Numerical solution of algebraic and transcendental equations and systems of equations, finite differences, interpolation, numerical integration, and numerical solution of ordinary differential equations. 3 lectures. Prerequisite: Math 242 or consent of instructor.

CSc 333 Numerical Analysis (3)

Continuation and expansion of CSc 332. Methods for the solution of equations and systems of equations, interpolation, the solution of ordinary and partial differential equations; emphasis on methods suitable for the application of electronic digital computers. 2 lectures, 1 activity period. Prerequisite: CSc 332 and ability to program in Fortran.

CSc 340 Cobol Programming (3)

Structure of the Common Business-Oriented Language (COBOL). Coding fundamentals and program logic. Writing of complete Cobol programs applied to typical business data processing problems. 3 lectures. Prerequisite: Any computer programming course.

CSc 345 Data Structures (3)

Basic concepts of data, storage systems and their properties, data transmission, sequential and linked lists, tree structures, multilinked structures, accessing and traversal, applications to compiler design, list and string processing, sorting, and programming languages. 3 lectures. Prerequisite: CSc 222, CSc 301 or 310

CSc 350 Systems Analysis (3)

Analysis of administrative and management problems to develop systems utilizing automatic data processing equipment. New and improved procedures, methods and organizational structure to obtain desired objectives. 3 lectures. Prerequisite: Knowledge of Fortran programming.

CSc 351 Algorithmic Compilers (3)

Formal languages, their decomposition and compiling. Binding and localizing variables using block structures in the analysis of compilers. Dynamic allocation of storage between sections of a process. 3 lectures. Prerequisite: CSc 222 or 304 or equivalent.

CSc 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with not more than 2 units in any one quarter. Prerequisite: Permission of the department head

CSc 410 Computer Fundamentals for Educators (3)

For students who plan to utilize computers at the school or district level. Computer fundamentals. Developing skill in a basic computer language. Programming techniques with applications to educational problem-solving strategies. Not open to students who have taken a previous COBOL course. 3 lectures. Prerequisite: junior standing.

CSc 411 Computer Applications in School Administration (3)

Applications of computer techniques to data processing and other management applications in the administration of schools and school districts. 3 lectures. Prerequisite: CSc 410 or knowledge of COBOL programming.

Computer Science

CSc 419 Mathematical Programming (3)

Extensions of linear programming, introduction to non-linear programming, dynamic programming and dynamic optimization procedures with industrial applications. 3 lectures. Prerequisite: CSc 219, 350; Math 143

CSc 451 Programming Languages (3)

Selected digital computer programming languages and their adaptability to various fields of application. 3 lectures. Prerequisite: CSc 351

CSc 452 Computer Programming Systems (3)

Design of assembly systems, macro instructions, program intercommunication and linkage. Structure and use of program libraries. Input and output programming systems, debugging systems and source language debugging. Assembly systems and software. Batch processing and executive systems. 3 lectures. Prerequisite: CSc 222 or 304 or equivalent.

CSc 453 Multi-programming and Multi-processor Systems (3)

Interrupt, sequential, and multi-programming systems. Priorities and scheduling. Time sharing systems. Use of bulk memory. Simple two-processor systems and programming. System and language requirements. 3 lectures. Prerequisite: CSc 452 or equivalent.

CSc 455 Computer Graphics (3)

Graphics techniques for computer input, output, manipulation and control. Printer, plotter and cathode ray tube (CRT) displays. Macro instructions for data handling and problem oriented routines. Use of graphics sub-routines for FORTRAN, COBOL and PL/1. Use of CRT displays for operating system job control. 3 lectures. Prerequisite: CSc 222

CSc 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

CSc 463 Undergraduate Seminar (2)

Reports and discussions by students through seminar methods, based on their senior projects and on other topics relating to computer usage and programming which are of interest to persons preparing for a career in computer science. 2 activity periods.

CSc 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor

CSc 531 Numerical Analysis (3)

Approximations to functions useful in computers including minimax approximations. Numerical solution of linear systems with special reference to computer applications and to error analysis. 3 lectures. Prerequisite: CSc 332

CSc 532 Numerical Solution of Ordinary Differential Equations (3)

Solution of initial value and boundary value problems by numerical methods, with emphasis on computer techniques. Stability problems and error propagation. 3 lectures. Prerequisite: CSc 332

CSc 533 Numerical Solution of Partial Differential Equations (3)

Numerical procedures for solution of parabolic, elliptic, and hyperbolic partial differential equations, with emphasis on computer techniques. Analysis of convergence and stability problems. 3 lectures. Prerequisite: CSc 333

CONSERVATION

Cons 311 Introductory Conservation (3) (3)

Basic principles and problems of conservation. Organization, control and inter-relationships of government and private agencies dealing with the conservation of natural resources. 3 lectures. Prerequisite: Junior standing.

Cons 431 Game Management (4)

General principles, problems and techniques of increasing the harvest of waterfowl, upland game and big game. The identification and life histories of important western game species. 3 lectures, 1 laboratory. Prerequisite: Bio 325 or ASci 229 or Zoo 326

Cons 433 Inland Fisheries (4)

Habitat improvement, harvesting and propagation of trout and warmwater fish. Identification and life histories of important western species. Farm pond management. 3 lectures, 1 laboratory. Prerequisite: Bio 325 or Chem 226



CONSTRUCTION ENGINEERING

ConE 240 Additional Engineering Laboratory (1-2)

Total credit limited to 4 units with not more than 2 units in any one quarter. 1 or 2 laboratories.

ConE 317 History of Construction (3)

Development of construction techniques and building science. Effects of scientific and engineering advancements on construction theory. The construction engineer as a member of the building team and as consultant to the architect, planner and structural engineer. 3 lectures. Prerequisite: Junior standing.

Construction Engineering/Crops

ConE 341, 342, 343 Construction Practice (2) (2) (2)

Masonry and concrete structures. Emphasis on recently-developed building systems, equipment, materials and techniques. Related construction drawings and details, design of formwork. One designated field trip required. 2 laboratories. Prerequisite: Arch 206, 233, 253

ConE 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ConE 441, 442, 443 Construction Practice (2) (2) (2)

Continuation of ConE 343. Problems in quantity surveying, estimating. 2 activities. Prerequisite: ConE 343

ConE 451, 452, 453 Construction Engineering Laboratory (5) (5) (5)

Comprehensive projects stressing decision making and design solutions to the problems in construction engineering; team projects encouraged. Emphasis on critical path planning and cost control, job organization, scheduling and financing, field projects supervision, bidding procedures and construction law applications. 5 laboratories. Prerequisite: ConE 343, Arch 306, Stat 321

ConE 461, 462 Senior Project (2) (2)

Selection and completion of a comprehensive project under faculty supervision. Problems to involve the student's technical and creative skills. Construction and team projects encouraged. 120 hours minimum total time. Prerequisite: ConE 343

ConE 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

CROPS SCIENCE

CrSc 100 General Agricultural Pest Control (4)

Identification and control of common pests of agriculture. Safe use of pest control materials. Natural and chemical control of injurious insects, rodents, birds and diseases in the field and in storage. 3 lectures, 1 laboratory. For technical students only.

CrSc 123 Forage Crops (4)

Production, harvest, and utilization of principal California forage crops. Identification and utilization of forage plants studied in the field. Field trips to local areas. 3 lectures, 1 laboratory.

CrSc 131 Introduction to Crop Science (4)

Production principles for field and vegetable crops. Fundamental botany, taxonomy and cultural practices. Soil tillage, fertilization, seed selection, planting and harvesting methods, irrigation, weed control, pest control, and crop rotation. Production practices for cotton and sugar beets. 3 lectures, 1 laboratory. Credit will not be allowed for both CrSc 131 and CrSc 230

CrSc 132 Grain Crops (4)

Production, adaptation, distribution, and utilization of major crops harvested by combine including cereals, large seeded legumes, milo, flax, corn, and safflower. Field trips to major California cereal production areas. 3 lectures, 1 laboratory. Prerequisite: CrSc 131 or VgSc 230

CrSc 133 Row Crops (4)

Adaptation, production, and utilization of major row crops such as potatoes, sweet corn, tomatoes, artichokes, garlic, onions, asparagus, and peas. 3 lectures, 1 laboratory. Prerequisite: CrSc 131 or VgSc 230

CrSc 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

CrSc 221 Weed Control (4)

Identification, life histories, and control of common, noxious, and poisonous California weeds. Weed control chemicals and equipment for cultivated crops, irrigation systems, range, wastelands. 3 lectures, 1 laboratory. Prerequisite: Sophomore standing

CrSc 223 Vertebrate Pest Control (3)

Vertebrate pests injurious to agriculture crops, livestock, and stored products, with emphasis on ground squirrels, rats, mice, birds, gophers, and other animals. Life habits, identification, control methods, and materials. Related laws and regulations. 2 lectures, 1 laboratory.

CrSc 230 General Field Crops (4)

Production, harvest, and use of important cereal and field crops in California. Production areas, crop rotations, disease and pest control. 3 lectures, 1 laboratory. Credit will not be allowed for both CrSc 131 and 230

CrSc 231 Commercial Seed Production and Processing (4)

Production and processing of certified and commercial seed including seed analysis, germination, quality control, cleaning and storage techniques, and seed laws. 3 lectures, 1 laboratory. Prerequisite: CrSc 132 or 133

CrSc 303 Agricultural Code of California (3)

Services and procedures of the California Agricultural Code. Provisions of the Agricultural Code and other laws affecting agricultural industries, particularly plant industries. Grain warehouse inspection, seed inspection, county agricultural departments, plant quarantine and standardization. 3 lectures.

CrSc 304 Plant Breeding (4)

Application of principles of plant improvement through selection, hybridization, and utilization of hybrid vigor. 3 lectures, 1 laboratory. Prerequisite: Bio 303

CrSc 305 Agricultural Inspection and Services (3)

Purpose and functions of county departments of agriculture and the related functions within the State Department of Agriculture. Basic background material to qualify students for the eight specific County Inspectors Examinations. 3 lectures. Prerequisite: CrSc 303

CrSc 311 Principles of Insect Control (4)

Principles of controlling insect pests including biological, cultural, physical, mechanical, and chemical controls. Identification of insects injurious to California field, fruit, and vegetable crops including stored products and livestock. Insecticide formulation and methods of application. 3 lectures, 1 laboratory.

CrSc 321 Advanced Methods of Pest Control (4)

Insecticide classification, insect toxicology, and resistance. Fate of pesticides in the environment. Alternate methods of insect control. Techniques of insect bioassay, insect and vertebrate toxicology, biological controls, insecticide residues. 3 lectures, 1 laboratory. Prerequisite: CrSc 311, Chem 328

CrSc 322 Crop Technology (4)

Grades and laboratory tests for quality of California field crops. The effects of harvesting, storage, and quality control on market value and processing. 3 lectures, 1 laboratory. Prerequisite: CrSc 132, 133

CrSc 323 Tropical Crop Production (4)

Production distribution, adaptation and utilization of major field and vegetable crops of economic importance in tropical and subtropical areas. 3 lectures, 1 laboratory.

Crops

CrSc 325 Hay and Processed Forage Crops (3)

Intensive study of hay, dehydration and silage making procedures. Storage facilities, grades and market values, anti-oxidants and feed additives that affect bloat and feed quality. 2 lectures, 1 laboratory. Prerequisite: Chem 121

CrSc 326 Plant Protection Techniques (3)

Plant protection methods and techniques. Pesticide formulation and evaluation of application results for uniformity, rate, and effective placement. Air and ground applications, calibrations. Federal, state, and local laws governing pesticide use and application equipment. 2 lectures, 1 laboratory. Prerequisite: CrSc 221, 311

CrSc 330 Irrigated Pasture and Range (4)

Identification, production, utilization of irrigated pasture crops and range plants. A study of grazing systems and the merits of mixtures and non-mixtures. A field trip to a production area may be required. 3 lectures, 1 laboratory. Prerequisite: CrSc 131 or CrSc 230

CrSc 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head

CrSc 410 Crop Physiology (4)

Practical studies in plant nutrition, soil-water-plant relationships, seed physiology, growth regulators, pesticide reactions, and controlled environments. 3 lectures, 1 laboratory. Prerequisite: Bot 122, SS 221, CrSc 131 or 230, and Chem 328

CrSc 411 Experimental Techniques and Analysis (4)

Principal methods of experimental design and analysis of collected data. Field practice in planning and lay-out with emphasis on management of agronomic and soils experiments. 3 lectures, 1 laboratory. Prerequisite: Junior or senior standing and Math 103 or equivalent.

CrSc 421 Oil and Fiber Crops (4)

Culture, harvest, grading, and marketing of cotton, flax, safflower, castor beans, minor oil and fiber crops. Field trips to major centers of production and marketing are required. 3 lectures, 1 laboratory. Prerequisite: CrSc 131 or 230

CrSc 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

CrSc 463 Undergraduate Seminar (2)

Oral presentation and leadership of group study on recent developments in the major field. 2 lectures.

CrSc 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

CrSc 521 Advanced Field Crop Production (4)

Production and management of field crops under both intensive and extensive cultural practices; interaction between the various growth factors at various levels of production and interaction of cultural practices and plant requirements. 3 lectures, 1 laboratory. Prerequisite: Permission of the instructor.

CrSc 581 Graduate Seminar in Crop Production (3)

Group study and oral reports on current technical problems and research results pertaining to field and vegetable crops production or marketing. 3 lectures.

DAIRY HUSBANDRY

DH 101 Dairy Feeds and Feeding (2)

Identification and classification of feeds; simple use of food nutrients, protein, fat, and carbohydrates; methods of preparing feeds; relative values of common feeds for each class of livestock with special attention to dairy cattle, the use of byproduct feeds. 2 lectures.

DH 102 Feeding Dairy Cattle (2)

Balancing dairy cattle rations. Feeding practices and nutritional requirements. 2 lectures. Prerequisite: DH 101

DH 121 Elements of Dairying (4)

General introductory dairy course. General information on statistics and opportunities in the dairy industry. Composition and food value of dairy products. Common tests to determine quality of products. Principles and practices of the feeding and management of dairy cattle. 3 lectures, 1 laboratory.

DH 133 Fitting and Showing Dairy Cattle (2)

Selection, preparation, presentation of dairy cattle for shows, sales, and photographing. 1 lecture, 1 laboratory.

DH 142 Dairy Cattle Judging (2)

Selection of dairy cattle with consideration to breed characteristics and conformation. Correlation between type and production. 2 laboratories.

DH 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.



Dairy Husbandry

DH 221 Milk Production (4)

Factors affecting milk production. Dairy production problems and methods. Practice in many of the frequently used dairy production skills. 3 lectures, 1 laboratory. Prerequisite: DH 102, 121, 142

DH 222 Commercial Dairy Herd Management (4)

Commercial dairy practices from the standpoint of cost of feeding and management. Visits are made to successful dairy farms. 3 lectures, 1 laboratory. Prerequisite: DH 221

DH 230 General Dairy Husbandry (4)

Selection, breeding, feeding, and management of dairy cattle. Composition and food value of dairy products. Dairy industry statistics and opportunities. Producing and handling products. A general course for other than dairy majors. 3 lectures, 1 laboratory.

DH 233 Advanced Dairy Cattle Judging (2)

Advanced practice in the comparative judging of dairy cattle. Detailed scoring and classifying cattle on conformation with extensive training on giving oral reasons. Visits to breeding establishments and shows. Judging teams may be selected in this class. 1 lecture, 1 laboratory. Prerequisite: DH 142

DH 301 Advanced Dairy Cattle Feeding (2)

Nutrition requirements of dairy cattle. Successful, economical feeding practices. 2 lectures. Prerequisite: DH 102

DH 323 History of Breeds and Pedigrees (4)

Origin of modern dairy cattle breeds, organization of cattle clubs. Breed families and herds. Practice in compiling pedigrees. 3 lectures, 1 laboratory. Prerequisite: DH 221

DH 326 Purebred Dairy Herd Management (4)

Methods and problems in establishing, breeding, feeding, and management of a purebred dairy herd and farm. Visits are made to leading purebred dairy farms and to purebred cattle sales. 3 lectures, 1 laboratory. Prerequisite: DH 222, 233, 301, 323

DH 330 Artificial Insemination (2)

Techniques in the collection, evaluation, processing, storage and shipment of semen. Insemination procedures. Fertility problems. Record keeping. 1 lecture, 1 laboratory. Prerequisite: DH 121 or AH 121, VS 123 or VS 100

DH 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

DH 422 Breeding and Selection of Dairy Cattle (4)

Evaluation of inherited characteristics in dairy cattle from an economic standpoint. Proving and selecting sires and dams. 3 lectures, 1 laboratory. Prerequisite: Bio 303, DH 142

DH 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

DH 463 Undergraduate Seminar (2)

Reports on student papers, bulletins, periodical articles, and dairy research experiments. Sources of dairy husbandry information. Practice in oral reporting. Late developments and research work in the dairy industry. 2 lectures.

DH 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

DH 519 Advanced Animal Genetics (3)

Application of advanced genetic principles to a program of animal improvement. Mating systems, methods of selection and expected gains. Genetic basis of estimates of heritability, repeatability, genetic correlation, and the development of economical selection indices. 3 lectures. Prerequisite: Bio 303 and permission of instructor.

DH 581 Graduate Seminar in Dairy Production (3)

Current findings and research problems in the field and their application to the industry. 3 lectures.

DAIRY MANUFACTURING

DM 132 Ice Cream Making (4)

Calculating and processing ice cream mixes. Proper equipment and methods required to freeze, package, harden and distribute ice cream and related products. Practice in the college creamery as well as inspection of commercial plants. Manufacture of sherbets and ice milk. Survey of the imitation ice cream field, processing of vegetable fats, etc. 3 lectures, 1 laboratory. Prerequisite: DH 121

DM 133 Market Milk (4)

Buildings, equipment and methods used to handle, process and distribute market milk. Judging and grading market milk. Practice in the college creamery and sales room as well as in commercial plants. 3 lectures, 1 laboratory. Prerequisite: DH 121

DM 220 Dairy Product Consumer Education (2)

Consumer education in identification, selection, and nutritional value of dairy products. Comparison of dairy products with substitutes and imitations. Uses of dairy products in diets and home meal planning. Caloric values, chemical compositions, and constituents of dairy products. 1 lecture, 1 activity.

DM 230 General Dairy Manufacturing (4)

Nontechnical presentation of the methods and problems involved in modern creamery operation. Testing, flavoring and manufacturing butter, various cheeses, ice cream, market milk, and related products. Elective course for non-dairy students. Survey course for dairy husbandry majors. 3 lectures, 1 laboratory.

DM 232 Cheese Making (4)

Equipment and methods needed to manufacture, package, cure and market various types of cheese. Practice in the college creamery. 3 lectures, 1 laboratory. Prerequisite: DH 121, Bact 221, DM 133

DM 233 Dairy Products Judging (2)

Theory and practice in the scorecard grading of butter, cheese, ice cream, cottage cheese, and market milk. 1 lecture, 1 laboratory. Prerequisite: DM 232

DM 236 Buttermaking (4)

Equipment and methods needed to handle and process manufacturing cream. Churning, packaging, storing, and marketing butter. Theory of continuous butter-making. Practice in college creamery. 3 lectures, 1 laboratory. Prerequisite: DH 121, DM 132

DM 303 Dairy Product Merchandising (2)

Product promotion, advertising, merchandising. State and national programs. Independent advertising and sales promotion programs. 2 lectures.

DM 331 Condensed and Dry Milk (4)

Processing, packaging, and marketing of evaporated and condensed milk and dry milk powders. Field trips are made to study commercial plants, methods and equipment. Mojonner analysis and other routine tests. 3 lectures, 1 laboratory. Prerequisite: DH 121, DM 132, Bact 222

DM 332 Dairy Inspection (2)

California dairy codes and score cards used for dairy plants and farms. Quality tests of dairy products. Practice in inspecting and scoring dairy farms and factories. Organizational structure of inspection services. Laws governing pricing and marketing. Role of antibiotics and pesticides in modern dairying. 1 lecture, 1 laboratory. Prerequisite: DH 121, DM 133, Bact 221

Drama

DM 333 Advanced Dairy Products Judging (2)

Judging and scoring of milk, butter, cheddar cheese, ice cream and cottage cheese. Commercial scoring with emphasis on the finer points of competitive grading and scoring. 2 laboratories. Prerequisite: DM 233

DM 431 Dairy Plant Management (4)

Basic management principles applied to the Dairy Industry. Industrial organization and control. Dairy plant location, design facilities and layout. Elements of successful salesmanship, advertising, and marketing. Survey of overhead allocation and of financing and depreciation applied to the dairy industry. Study of significant operating ratios and comparative analysis of financial statements. 3 lectures, 1 laboratory. Prerequisite: Senior standing.

DRAMA

Dr 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Dr 220 Introduction to Theater (3)

Theatrical terminology, basic stagecraft and lighting, stage management, theater practice. Historical development of the theater. 2 lectures, 1 two-hour laboratory.

Dr 320 Acting (3)

Basic acting techniques, improvisation, characterization, pantomime and movement. 2 lectures, 1 two-hour laboratory. Prerequisite: Dr 220

Dr 321 Directing (3)

Script analysis, motivation and blocking of action, preparation of the prompt book. Direction of practice scenes. 2 lectures, 1 two-hour laboratory. Prerequisite: Dr 220

Dr 322 Stagecraft (2)

Scenery design, construction, painting, lighting, costumes, and make-up. 2 two-hour laboratories. Prerequisite: Dr 220

Dr 327, 328 Theatrical History and Literature (3) (3)

History of the theater and correlated studies of representative plays from 500 B.C. to 1660 A.D., and from 1660 A.D. to present. 3 lectures. Prerequisite: Dr 220

Dr 331 Applied Theater Practices (2)

Preparation of a play for public presentation, including acting, stage management, make-up, publicity and house management. Maximum of 6 units credit may be earned. 2 laboratories.

Dr 347 Children's Theater (3)

Role-playing, group dramatization, and related activities. For students preparing to teach in the elementary school. 1 lecture, 2 laboratories.

Dr 422 Stage Scenery and Lighting Design (3)

Stage scenery and lighting design from the study of the script through the rendering of elevations and the construction and lighting of models. Light and color as used in scenery design. 3 lectures. Prerequisite: Dr 220

Dr 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

ECONOMICS

Ec 105 Consumer Economics (3)

Consumer-producer relationships, money management, buying methods; investments, insurance, and housing; agencies that help the consumer. 3 lectures.

Ec 201 Survey of Economics (3)

Basic material covered in Principles of Economics, Ec 211, 212, 213 in a less detailed and technical manner. For majors requiring one quarter of economics. Not open to students with previous credit in Ec 211 or 212 or equivalent. 3 lectures. Prerequisite: Sophomore standing. Successful completion of Freshman Composition recommended.

Ec 211 Principles of Economics (3)

How the economic system works. Analysis of the forces which determine the levels of national income, output, employment and prices. 3 lectures. Prerequisite: Sophomore standing. Successful completion of freshman English recommended.

Ec 212 Principles of Economics (3)

Introductory analytical economics. Principles and applications in the allocation of scarce resources; the pricing and output problems of the firm; distribution of factor income; and their effects in the national economy. 3 lectures. Prerequisite: Ec 211 or consent of instructor.

Ec 213 Principles of Economics (3)

Application of economic principles in an increasingly complex world. 3 lectures. Prerequisite: Ec 212

Ec 301 Introduction to Managerial Economics (3)

Fundamental principles and analytical tools of economics useful in business decision making; applications to management through case study of actual business and managerial situations. 3 lectures. Prerequisite: Ec 212 or consent of instructor.

Ec 304 Comparative Economic Systems (3)

Analysis of economic principles and institutions applicable to capitalism, socialism, and communism. 3 lectures. Prerequisite: Ec 212

Ec 311, 312, 313 Intermediate Economic Analysis (4) (4) (4)

Economics of prices, markets; demand, supply, returns, and costs; employment, income; factor pricing and income distribution; welfare and economic progress. Analytical model building, analysis and policy decision making in business firms, households and government. 4 lectures. Prerequisite: Ec 213 or equivalent; Math 200, 210, Stat 211, 212 or equivalent. Prerequisite for Ec 313 is Ec 337.

Ec 317 Development of Economic Analysis (3)

Analysis of ideas related to the development of economic theory in the Western civilization from the Greeks through the classical, neoclassical, and Keynesian to the current post-Keynesian concepts. 3 lectures. Prerequisite: Junior standing and satisfactory completion of Ec 211, 212, 213, or equivalent.

Ec 324 American Economic History (3)

Topical economic analysis of major events and institutions of American economic history as viewed against their causes, origin and development. Economic development of America from an underdeveloped nation. Agriculture, transportation, monetary and banking policies, business, labor, and growth of governmental activities. 3 lectures. Prerequisite: Ec 213

Ec 325 Underdevelopment and Economic Growth (3)

Economic Development: the less developed world and the American interest. 3 lectures. Prerequisite: Ec 211 or 201

Economics

Ec 337 Money, Banking and Credit (3)

Institutions and principles of money flow and money markets as they relate to the business enterprise. 3 lectures. Prerequisite: Ec 201 or 211

Ec 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

Ec 401 International Trade (3)

The United States and the world economy; mechanism of exchange; balance of payments. 3 lectures. Prerequisite: Ec 201 or 211

Ec 402 Public Finance (3)

Principles of government financing and its various economic and social effects; collecting, spending and administration of public funds, particularly at state and local levels. 3 lectures. Prerequisite: Ec 212 or consent of instructor.

Ec 406 Business Fluctuations and Forecasting (3)

Causes and measurement of business fluctuations. Techniques of forecasting. 3 lectures. Prerequisite: Ec 201 or 211, Stat 212

Ec 410 Cost-Benefit Analysis (3)

Principles of rational decision making with respect to business and government spending. Measurement of costs and benefits, interest rates, and criterion selection. 3 lectures. Prerequisite: Ec 312

Ec 413 Labor Economics (3)

Wage determination theory, basic economic factors that affect the labor movement, economic impact of union activities on employment, output, income, wages, prices, and national economic policy. 3 lectures. Prerequisite: Ec 212 or consent of instructor.

Ec 414 Monetary and Fiscal Policies (4)

National economic fluctuation models and related corrective monetary and fiscal policies on income, employment, output, growth and prices. 4 lectures. Prerequisite: Ec 313, 337

Ec 415 Advanced Analysis of Economic Development (3)

Advanced development theory. Application of theory to specific development problems. Special interest study and discussion. 3 lectures. Prerequisite: Ec 313, 325

Ec 461 Senior Project (3)

Selection and analysis of a problem under faculty supervision. Problems typical of those which graduates must solve in their fields of employment. Formal report is required. Minimum 180 hours total time.

Ec 463 Undergraduate Seminar (3)

Seminar in applications of economic theory with emphasis on current problems. 3 meetings. Prerequisite: Ec 461

Ec 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: consent of instructor.

Ec 582 Seminar in Economic Problems (1-3)

Selected problems at an advanced level; distribution of income, private and public finance, economic mobilization, and international trade. 1 to 3 meetings. Prerequisite: 9 units of economics and graduate standing or consent of the instructor. Maximum of 6 units credit may be earned.

EDUCATION

Ed 203 Efficient Reading (2)

Development of reading efficiency required in modern business, industry, and the professions. 1 lecture, 1 activity. Prerequisite: Eng 104

Ed 304 Human Development (3)

Human development with emphasis on the years up to adolescence. The physical, mental, emotional, and social aspects of development and behavior. Controlled observation in the public schools. Required for California elementary teaching credential. Recommended for secondary teacher candidates. 2 lectures, 1 activity. Prerequisite: Junior standing, Psy 202

Ed 312 Educational Psychology (3)

How students learn in school, motivation and classroom management, nature of the learning process and adolescent development. Observations at appropriate grade levels. Required for California secondary teaching credential. Recommended for elementary teacher candidates. 3 lectures. Prerequisite: Psy 202

Ed 322 Community Laboratory (2)

Learning experiences in cooperation with youth club activities and educational agencies. Application of knowledge and skills acquired in college classrooms. Supervised activities with children and adults in educational programs. 1 lecture, 1 activity. Total credit limited to 4 units. Prerequisite: Ed 304, 312, or permission of the instructor.

Ed 401 Public Education in American Society (3)

Development of public education in United States and California. Purpose and structure of the school system. Observations in the public schools. Prerequisite for application to teacher education program. Required for California elementary and secondary teaching credentials. 3 lectures.

Ed 403 Teaching Procedures in the Secondary School (3)

Practical skills and techniques of teaching; instruction planning, classroom control, demonstration teaching, communication media, and public school observations. 3 activity periods. Required for California secondary teaching credential. Prerequisite: Ed 312

Ed 415 Early Childhood Education (3)

Brief history of the kindergarten and nursery school program. Study of the needs, behavior and development of young children and how they affect readiness for learning. 3 lectures.

Ed 418 Principles of Adult Education (3)

Purposes, significance, scope and methods of teaching as applied to adult education. 3 lectures.

Ed 421 Audiovisual Instruction: Methods and Materials (3)

Visual and auditory methods and materials of value in classroom teaching in elementary and secondary schools. Lecture, lecture-demonstration, discussion, pre-viewing, and laboratory work. Planning and correlating use of audiovisual techniques in the classroom. 2 lectures, 1 laboratory. Prerequisite: Ed 312 or consent of instructor.

Ed 422 Audiovisual Training for Business and Industry (3)

Industrial uses of visual and auditory materials in planning training aids, mass communication materials, demonstrations, mockups, models, and conference leading techniques. Planning, pre-viewing, and skill development for business and industry. 2 lectures, 1 laboratory. Prerequisite: Psy 302 or consent of instructor.

Education

Ed 423 Audiovisual Production Workshop (3)

Analysis of advanced problems of instruction, production of materials in relation to these problems, using audiovisual materials and methods. Skill development in problem-solving through contact with materials, equipment, and methods employed in audiovisual communication. 2 lectures, 1 laboratory. Prerequisite: Ed 421 or 422, or consent of instructor.

Ed 431 Teaching Procedures in the Elementary School (3)

Introduction to procedures used in elementary school teaching, development of skills in planning units of work and lessons for all areas of the curriculum, use of audiovisual materials, preparation for student teaching. 3 activities. Prerequisite: Advanced standing and Ed 304

Ed 434 Curriculum and Methods in Elementary School Reading (3)

Teaching reading, reading readiness, psychology of learning to read, instructional materials, evaluating growth, developing independent reading skills, recreational reading. 2 lectures, 1 activity. Prerequisite: Advanced standing.

Ed 439 Supervised School Experience (3-5)

Supervised observation and participation in public schools, including experience as teacher aide or instruction assistant. Weekly seminars relating principles to improved participation practice. Prerequisite: Ed 312, Ed 401 (may be taken concurrently)

Ed 440 Student Teaching (3-12)

Student teaching includes participation, teaching, and allied activities under the direction of a selected regular teacher in a public school in consultation with college supervisors. The application for student teaching must be approved prior to registration for Ed 440. A grade below C is unacceptable for recommendation for a credential.

Ed 441 Student Teaching Practicum (3)

Practices and problems of student teaching. Consideration of professional school and community experiences encountered during student teaching. Current innovations in teaching procedures and materials. Taken concurrently with student teaching. 2 lectures, 1 activity.

Ed 442 Curriculum and Methods in Kindergarten-Primary Education (3)

Objectives, methods, and curriculum for the kindergarten-primary grades. Acquisition of appropriate materials, and construction of instructional aids. 2 lectures, 1 activity. Prerequisite: Advanced standing.

Ed 443 Curriculum and Methods in Elementary School Language Arts (3)

Methods and materials for teaching language usage, spelling, handwriting, listening and speaking. 2 lectures, 1 activity. Prerequisite: Advanced standing.

Ed 444 Curriculum and Methods in Elementary School Science (3)

Curriculum, methods, and teaching procedures in elementary school science. 2 lectures, 1 activity. Prerequisite: Advanced standing and approval of credential advisor.

Ed 445 Curriculum and Methods in Elementary School Social Studies (3)

Curriculum, methods, and teaching procedures in elementary school social studies with emphasis on the California program. 2 lectures, 1 activity. Prerequisite: Advanced standing and approval of credential advisor.

Ed 446 Curriculum and Methods in Conservation Education (3)

Methods of integrating conservation into the curriculum of the public schools. Techniques of teaching, instructional materials, resources, and audio-visual aids. For inservice and preservice personnel. 2 lectures, 1 activity. Prerequisite: Cons 311, Bio 325, SS 332, PE 337



Ed 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

Ed 500 Individual Study (1-3)

Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Enrollment by petition. Prerequisite: Consent of the department head, the graduate major adviser, the supervising faculty member, and Ed 524

Ed 501 Philosophy of Education (3)

The function of philosophy; the meaning of education; significance of present philosophical points of view; education aims and values; democracy and education; the relationship of various philosophical outlooks to educational methods and subject matter. 3 lectures.

Ed 503 Counseling and Guidance (3)

The philosophy, techniques, and administration of individual and group guidance programs. Individual counseling. The assessment of students' interests, abilities, and achievement with respect to educational and vocational choice, and school and life orientation. 3 lectures.

Ed 504 Measurement and Evaluation in Secondary School Teaching (3)

Instructional objectives, evaluation, and testing achievement in school courses. Constructing, administering, and evaluating tests for classroom use. Grading techniques and procedures. 3 lectures.

Ed 506 Evaluation in the Elementary School (3)

Appraising the results of instruction in terms of educational objectives. Pupil growth as a product of environment, health, attitudes, and mental ability. Value of cumulative records, reports to parents, and teacher-made tests as evaluation devices. 3 lectures. Prerequisite: Student teaching experience or approval of instructor.

Education

Ed 507 Staff-Administrator Relationships (3)

Personnel administration of schools and school systems, including conditions of employment, salary, security, and retirement benefits. Problems of staff morale evaluated in terms of selection, promotion, assignment, and opportunities for professional improvement. 3 lectures. Prerequisite: Valid teaching credential.

Ed 508 Educational Sociology (3)

Sociological backgrounds of school children; effects of social, economic, and political trends and issues on education; problems of leisure, recreation, and occupations; modern interpretations of democratic ideology. Sociological problems are utilized to define the social objectives of the school. 3 lectures.

Ed 510 School Finance and Business Management (3)

A consideration of the sources of public school support in California and the formulas by which funds are distributed to educational agencies. Budgets, audits, accounting, financial statements, insurance salaries and retirement, purchasing and managing of plants, equipment, and supplies. 3 lectures. Prerequisite: Valid teaching credential, or consent of instructor.

Ed 511 School Law (3)

The legal problems affecting schools, using as sources the California Administrative Code, Title 5, the Education Code, the Attorney General's opinions, and interpretations of the state and federal courts. 3 lectures. Prerequisite: Valid teaching credential or consent of instructor.

Ed 512 Secondary School Administration (3)

The three major phases of the work of the secondary administrator; his function as a leader of people, his duties as a director of education, and his techniques as an organizer and manager, including teacher-administrator relationships. 3 lectures. Prerequisite: Valid teaching credential or consent of instructor.

Ed 513 Federal, State, County, and City School Administration (3)

Objectives of public school administration and an overview of all levels of organization; problems in state, county, and city school organization, particularly as related to California; federal government and education; issues involved in federal support. 3 lectures. Prerequisite: Valid teaching credential or consent of instructor.

Ed 515 Secondary School Curriculum (3)

Advanced study of problems in secondary curriculum development; social and psychological backgrounds; techniques in curriculum development; communication problems in curriculum work; group processes in curriculum development; evaluation of curriculum programs. 3 lectures. Prerequisite: Valid teaching credential or consent of instructor.

Ed 516 Secondary School Supervision (3)

The administrative organization of supervision. City and county supervisory methods and procedures in secondary schools. Evaluation of present practices. In-service improvement of instruction through supervision. Group processes and communication problems in supervision work. 3 lectures. Prerequisite: Valid teaching credential or consent of instructor.

Ed 517 School-Community Relationships (3)

The school and public relations. The administrator's relationship with community groups and organizations. Effect upon the public schools of community and patrons. Public administration as it affects the community's educational program. Operation of urban and rural schools, vocational education, education for adults, special school programs and auxiliary agencies. 3 lectures. Prerequisite: Valid teaching credential or consent of instructor.

Ed 518 Problems in Teaching Reading (3)

Reading problems in the elementary school including diagnosis of reading deficiencies, remediation, and suitable reading material. 3 lectures. Prerequisite: Ed 434, 440

Ed 519 Teaching the Gifted Child (3)

The nature of the growth and development of gifted children, including physical, social, and achievement aspects. Methods of identifying giftedness, gifted children, and children with special abilities. Study of selected programs for teaching gifted children in California and other states. 3 lectures.

Ed 520 Elementary Reading Programs (3)

School reading programs and classroom organization. Application of research findings to teaching reading. Survey of innovative programs in elementary school readings. For teachers and supervisors. 3 lectures. Prerequisite: Ed 434 or permission of instructor.

Ed 521 Teaching the Culturally Different Child (3)

Cultural factors that inhibit learning in the school; problems and needs of the disadvantaged child; classroom procedures and materials to facilitate learning and increase educational achievement; preparation for teaching in depressed areas. 3 lectures.

Ed 523 Remedial and Special Education (3)

Theory and practice of diagnosing educational and psychological difficulties affecting the ability of children to profit from education. Case study and case conference approaches to understanding and assisting children with learning difficulties. 3 lectures. Prerequisite: Ed 503, Psy 432

Ed 524 Investigative Techniques (3)

Principles and methods of planning and carrying out systematic investigations dealing with learning, teaching, curriculum, instructional planning, pupil personnel services, and other related areas. 3 lectures. Prerequisite: Math 100, Psy 202

Ed 525 The Teacher's Role in Guidance (3)

Application of procedures in teaching and in conducting guidance activities. Use of techniques to implement the role of the teacher in guidance. Case studies, case conferences, parent-teacher conferences, teacher-pupil conferences. 3 lectures.

Ed 527 The Junior College (3)

The purpose, history, organization and curriculum of the junior and community college. For persons teaching and planning to teach in the junior college. 3 lectures.

Ed 528 Advanced Counseling Theory and Procedures (3)

Advanced practice in vocational, personal, and educational counseling for students in the pupil personnel program. Counseling theory and procedures, educational and career planning. Application of theory to practical counseling situations. 3 lectures. Prerequisite: Ed 503, 525

Ed 529 Supervision of Vocational and Practical Arts Education (3)

Methods of designing and implementing programs of vocational and practical arts education (applied arts) including agriculture, business, diversified co-operative, distributive, work experience education, homemaking, industrial arts, and trade technical education. 3 lectures.

Ed 531 Elementary School Supervision (3)

Principles and techniques of educational leadership in curriculum development. Curriculum improvement, working effectively with the staff, evaluation of instruction. Group processes and communication problems in supervision work. 3 lectures. Prerequisite: Valid teaching credential.

Ed 532 Elementary School Administration (3)

Principles and practices of organizing and administering the elementary school, including teacher and pupil personnel management, leadership techniques, instructional problems, special services, school plant, local school finances. Practical applications to elementary schools. 3 lectures. Prerequisite: Valid teaching credential.

Education/Electrical Engineering

Ed 539 Educational, Occupational and Community Information (3)

Collecting occupational, educational and community information including community resources such as agencies and organizations that provide services to individuals or groups. Sources and techniques of collecting and imparting such information stressed. 3 lectures. Prerequisite: Ed 503

Ed 541 Administration of Pupil Personnel Services (3)

Organization of pupil personnel services programs, their administration, their evaluation. Use of community resources and a study of laws relating to children and child welfare. 3 lectures. Prerequisite: Ed 503

Ed 544 Work Experience Education (3)

Organization, coordination, supervision, and laws related to work experience education. 3 lectures.

Ed 546 Supervised Field Experience in Counseling (3)

Practical application in the public schools or college counseling center of interviewing, counseling, test administration and interpretation, case conference techniques, use of counseling records and other principles and procedures in counseling. Besides field experience, weekly seminar sessions with college staff to be included. Prerequisite: Ed 541 and consent of instructor.

Ed 550 Vocational Education in the United States (3)

Curriculum and purpose of vocational and practical arts education in secondary schools, junior colleges and private enterprise in the United States. 3 lectures.

Ed 578 Elementary School Curriculum

Issues, trends and theories of evaluation and development of elementary school curriculum. 3 lectures. Prerequisite: Graduate standing.

Ed 581 Graduate Seminar in Education (1-3)

Group study of contemporary problems in education. Trends, developments, and issues. Total credit limited to 6 units. Prerequisite: Graduate standing.

Ed 588 Administration or Supervision Field Work (3)

Supervised field work in school administration or supervision at the elementary or secondary level; specific assignments made to cover important aspects of school administration or supervision. Prerequisite: Valid teaching credential, Ed 531 or 516, Ed 532 or 512, and consent of instructor.

Ed 590 Seminar in Supervision of Student Teachers (3)

Organization, responsibilities, problems, and procedures in supervising, directing, and evaluating student teachers and student teaching activities. 3 lecture-discussions.

ELECTRICAL ENGINEERING

EE 104 Electric Circuits (4)

Covers lecture material in EE 131, 132. For transfer students who have completed at least one year of calculus. 4 lectures.

EE 110 Orientation (1)

Familiarization with the field of electrical and electronic engineering. Content same as EL 110. 1 lecture.

EE 122 Electrical Engineering Analysis (4)

Elements of electricity. Basic electrical and electronic devices. Simple passive and active circuits. For non-EE majors. 3 lectures, 1 laboratory.

EE 131, 132 Basic Circuits and Devices (3) (3)

Elements of DC circuit analysis; basic circuit theorems. Phasor representation of AC parameters. Basic elements of AC steady state circuit analysis. Description of physical operation of semiconductor diodes and transistors. Elements of transistor amplifier behavior. Content same as EL 131, 132. 2 lectures, 1 laboratory.

EE 146 Graphics and Standards (1)

Schematic drafting and representation of electrical and electronic circuits, solid state devices, transducers and machines. Layouts, technical sketching, industrial standards, symbols and codes. Content same as EL 146. 1 laboratory. Prerequisite: ET 153

EE 154 Electric Laboratory (2)

Covers laboratory material in EE 131, 132. For transfer students. 2 laboratories.

EE 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

EE 201 Electric Circuit Theory (4)

Fundamental electric laws. Electric circuits and circuit theorems. Magnetism and magnetic circuits. Analysis of alternating current, single and three phase circuits using symbolic method (complex phasors). Transmission lines, coupled circuits and transients. For non-electrical engineering majors. 3 lectures, 1 laboratory. Prerequisite: Math 242, Phys 133

EE 207 Introduction to Electrical Fields (4)

Introduction to fundamental physical concepts underlying electronics, with particular reference to basic electric and magnetic field theory for application to the control of charged particles. Content same as EL 207. 3 lectures, 1 two-hour laboratory. Prerequisite: Phys 131, Math 143

EE 209 Basic Electrical Engineering (8)

Combines content of EE 201, 325. Primarily for transfer students. 6 lectures, 2 laboratories.

EE 211, 212 Electric Circuits (3) (3)

Sinusoidal steady state response. Average power and RMS values. The transient circuit. Complex frequency and frequency response. Two port circuits. Polyphase systems. Content same as EL 211, 212. 3 lectures. Prerequisite: EE 132 or equivalent, Math 143

EE 231 Electric Machines (4)

Physical and electrical characteristics of the more common types of DC and AC machinery. Provides background facilitating selection of appropriate machine for a specific job. For non-EE majors. 3 lectures, 1 laboratory. Prerequisite: EE 122 or basic circuits course.

EE 240 Additional Engineering Laboratory (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

EE 251, 252 Electric Circuits Laboratory (1)(1)

Laboratory exercises in transient and steady state electric circuits theory. Content same as EL 251, 252. 1 laboratory. Concurrent: EE 211, 212

EE 253 Engineering Problems Solutions (1)

Machine method of problem solutions. Digital and analog devices (excludes IBM Fortran programming). 1 laboratory.

EE 301 Analysis of Engineering Systems (4)

Methods used in analysis of engineering systems. Application in electromagnetics, control, power, communications, and energy conversion systems. 4 lectures. Prerequisite: Math 318, EE 207

EE 302 Engineering Electromagnetics (4)

Electric and magnetic fields. Maxwell's equations. Introduction to traveling waves and radiation. 4 lectures. Prerequisite: EE 207 or equivalent.

Electrical Engineering

EE 304 Electromechanics (3)

Magnetically-coupled circuits. Torque and power. Rotating machines. 3 lectures. Prerequisite: EE 207, 212

EE 307 Transmission Lines (4)

Distributed constants and traveling waves. Transmission line parameters and characteristic constants. Lines with and without reflection. Smith chart. Coaxial lines, waveguides, and antennas. Measurements and impedance matching. 3 lectures, 1 laboratory. Prerequisite: EE 301 or permission of the instructor.

EE 308 Power System Analysis I (4)

Introduction to power systems. Polyphase circuit analysis. Parameters and performance of power transmission lines. Symmetrical faults and loads. Economic aspects. Circuits normalization and denormalization, per unit values. Use of A-C Analyzer. 4 lectures. Prerequisite: EE 307

EE 321 Wave Propagation and Power Transmission (4)

Electromagnetic wave propagation. Power and signal transmission. Analysis of transmission lines and power systems. Symmetric loads and faults. Use of AC network analyzer. 3 lectures, 1 laboratory. Prerequisite: EE 212

EE 322 Network Synthesis (4)

The pole-zero concept of networks. Network analysis and synthesis in the frequency domain. Design of filters. 3 lectures, 1 laboratory. Prerequisite: EE 212 or equivalent.

EE 323 Linear Analysis with Analog Computer (4)

Laplace transform calculus and analog techniques applied to linear systems analysis. 3 lectures, 1 laboratory. Prerequisite: Math 318, EE 322

EE 324 Electrical Systems Design (3)

Elements of electricity. Electric circuits. Direct current voltage, current, and power. Alternating currents. Effective voltage and current. Power factor. Wiring installations. Code requirements. Devices used. Layout of electrical installations. Writing specifications. Primarily for architects. 3 lectures. Prerequisite: Phys 133

EE 325 Energy Conversion Electromagnetics (4)

The fundamentals of electro-mechanical energy conversion. Theory of operation and operating characteristics of transformers, D.C. machines and A.C. induction and synchronous machines. Electrical control devices and systems. For non-electrical engineering majors. 3 lectures, 1 laboratory. Prerequisite: EE 201

EE 326 Ethics in Engineering (2)

Introduction to business and legal aspects of engineering. Ethics as applied to the practice of engineering. 2 activities.

EE 327 Illumination (3)

Theory and practice of illumination. Mechanical and electrical problems in installation and control of lighting sources. Measurement of light. 2 lectures, 1 laboratory. Prerequisite: Consent of instructor.

EE 331, 332 Electromagnetic Machines (4)(4)

Transformers. Direct current machines. Analysis in the steady state and transient modes. Alternating current machines. Generalized, operational and dynamic analysis. Unbalanced operations. 3 lectures, 1 laboratory. Prerequisite: EE 304

EE 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of department head.

EE 402 Control Systems Engineering (3)

An advanced course in analysis and design of control systems based on root-locus, frequency domain and computer approach. Non-linear sampled data and self-adaptive systems. 3 lectures. Prerequisite: EE 431 or consent of instructor.

EE 403 Silicon-Control Rectifier Motor Control (3)

Theory of P-N-P-N devices, silicon rectifier controls, Triac etc., as circuit elements; firing circuits for SCR. Application of SCR to ac and dc motor control (speed and torque). Stability analysis of SCR—motor control systems. 2 lectures, 1 laboratory. Prerequisite: EE 332, EL 316

EE 404 Stochastic Linear Systems (3)

Application of probabilistic models to solution of system problems in control engineering and power systems. Engineering decision choices among alternative designs, systems and random signals. Analysis of linear systems with random input. Prerequisite: EE 301 or departmental approval.

EE 407 Power System Analysis II (4)

Load flow studies. Economics of power systems. Synchronous machines and faults. Symmetrical components. Unsymmetrical faults. Short circuit current calculations for symmetrical and unsymmetrical faults. Elements of power system stability. 4 lectures. Prerequisite: EE 308

EE 414, 415 Energy Conversion (3) (3)

Energy sources, conversion, and storage, with specific consideration of resources, chemical fuels, electrochemical fuels, electrochemical systems, semiconductors, thermoelectricity, thermionic generators, solar energy, and related topics. 3 lectures. Prerequisite: ME 302

EE 421, 422 Electrical Engineering Design (3) (3)

Application of engineering analysis to design problems. Creative thinking emphasized. Group and individual assignments. 1 lecture, 2 laboratories. Prerequisite: Senior standing in Electrical Engineering or consent of instructor.

EE 424 Analog Computation (2)

Analog techniques. Systems simulation. Design aids. 1 lecture, 1 laboratory. Prerequisite: Math 242

EE 425, 426 Plant Electrical Design (3) (3)

Principles of plant layout. Feeder design. Illumination codes. 1 lecture, 2 laboratories. Prerequisite: Consent of instructor.

EE 427 Analog and Hybrid Computation (4)

Analog computing elements. Speed and accuracy of computation. Analog and hybrid simulation. Use of relays, multipliers, and function generators. Hybrid computation, using memory and decision making. Automatic optimization by hybrid technique. 2 lectures, 2 laboratories. Prerequisite: Engr 251 and EE 323, or consent of instructor.

EE 428 Dynamic Instrumentation (3)

Electrical measurement of non-electrical phenomena. Transducers. Transmission systems. Recorders. Theory and operation. 2 lectures, 1 laboratory. Prerequisite: Consent of instructor.

EE 429 Precise Electrical Measurement (3)

Theory and technique of precise electrical measurement. Primary and secondary electrical standards. Application to measurement of voltage, current, and resistance. 2 lectures, 1 laboratory. Prerequisite: EE 428

EE 431 Linear Control Systems Design (4)

Automatic feedback control systems. Design of linear systems. 3 lectures, 1 laboratory. Prerequisite: EE 323 or EL 302

EE 432 Digital Computers (3)

Theory and design. Application to control. 2 lectures, 1 laboratory. Prerequisite: EL 316 and consent of instructor.

Electrical/Electronic Engineering

EE 444 Power Systems Analysis (1)

Solutions of unsymmetrical fault and stability problems on the A.C. analyzer. 1 laboratory. Concurrent: EE 407

EE 451 Senior Electrical Engineering Laboratory (1)

Individual project fabrications resulting from student's creativity and employing previously learned skills of analysis and synthesis. Emphasis on professional development. 1 laboratory. Prerequisite: Senior standing in Electrical Engineering.

EE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

EE 463 Undergraduate Seminar (2)

Reports and discussions on library study and laboratory research in approved individually selected topics in electrical engineering. 2 meetings.

EE 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.



ELECTRONIC ENGINEERING

EL 110 Orientation (1)

Familiarization with the field of electrical and electronic engineering. Content same as EE 110. 1 lecture.

EL 113 Electronic Instruments (2)

Analysis of selected basic electronic instruments and their application to measurement in the field of electronic engineering. Introduction to both the analog and digital computers with solution of appropriate mathematical problems. 2 lectures. Prerequisite: EL 112, Math 141 or 131, Phys 131 or 121

EL 131, 132 Basic Circuits and Devices (3) (3)

Elements of DC circuit analysis; basic circuit theorems. Phasor representation of AC parameters. Basic elements of AC steady state circuit analysis. Description of physical operation of semiconductor diodes and transistors. Elements of transistor amplifier behavior. Content same as EE 131, 132. 2 lectures, 1 laboratory.

EL 146 Graphics and Standards (1)

Schematic drafting and representation of electrical and electronic circuits, solid state devices, transducers and machines. Layouts, technical sketching, industrial standards, symbols and codes. Content same as EE 146. 1 laboratory. Prerequisite: ET 153

EL 153 Electronic Instruments Laboratory (1)

Directed projects investigating the more common electronic instruments and their use in measuring voltages, current, waveform, frequency, and phase. Introductory study of elements of the analog and digital computers. 1 laboratory. Concurrent: EL 113

EL 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

EL 207 Introduction to Electrical Fields (4)

Introduction to fundamental physical concepts underlying electronics, with particular reference to basic electric and magnetic field theory for application to the control of charged particles. Content same as EE 207. 3 lectures, 1 two-hour laboratory. Prerequisite: Phys 131, Math 143

EL 211, 212 Electric Circuits (3) (3)

Sinusoidal steady state response. Average power and RMS values. The transient circuit. Complex frequency and frequency response. Two port circuits. Polyphase systems. Content same as EE 211, 212. 3 lectures. Prerequisite: EL 132 or equivalent, Math 143

EL 240 Additional Engineering Laboratory (1-2)

Total credit limited to four units, with not more than two units in any one quarter. 1 or 2 laboratories.

EL 251, 252 Electric Circuits Laboratory (1) (1)

Laboratory exercises in transient and steady state electric circuits theory. Content same as EE 251, 252. 1 laboratory. Concurrent: EL 211, 212

EL 301, 302 Linear Circuits Analysis (3) (3)

The response of linear electronic circuits and systems to various excitations using principally Fourier and Laplace transform methods. Analysis and synthesis of one and two part frequency selective networks with fixed and distributed parameters. Butterworth and Chebyshev polynomials. 3 lectures. Concurrent or prerequisite: EL 212. Prerequisite: Math 318

EL 307 Electron Devices (4)

Physical and analytical study of various electron devices with primary emphasis on semiconductor material, diode and transistor theory. Transistor circuit models and biasing. 4 lectures. Prerequisite: EL 207, 212. Concurrent: EL 347

EL 313 Analog Computer Techniques (3)

Course designed for mathematics, science and engineering majors other than electronic and electrical. Fundamental principles of analog computers, field of application in science and engineering. Programming techniques. Output devices. Simulation of linear and non-linear systems. 2 lectures, 1 two-hour laboratory. Prerequisite: Math 242

Electronic Engineering

EL 314 Electronic Circuits (3)

Analysis and design of linear, small-signal electronic amplifiers; stabilization and biasing techniques; feedback. 3 lectures. Prerequisite: EL 307, Math 242

EL 315 Electronic Circuits (3)

Analysis and design of power amplifiers, tuned amplifiers, oscillators, modulators, detectors and frequency converters. Graphical and piecewise-linear analytical techniques are emphasized. 3 lectures. Prerequisite: EL 301, 314

EL 316 Electronic Circuits (3)

Analysis and design of pulse, digital, gating, counting and timing circuits. Piecewise-linear analytical techniques are emphasized. 3 lectures. Prerequisite: EL 301, 314

EL 319 Logic and Switching Circuits (3)

Fundamentals of Boolean algebra. The simplification of combinational logic circuits using tabular, map, and computer techniques. Combinational circuit synthesis in terms of NAND, NOR and other modern logic circuits. Analysis and synthesis of asynchronous and clocked sequential circuits; basic computer concepts. 3 lectures. Prerequisite: EL 314

EL 321 Electronics (4)

Thermionic and semiconductor electronic devices and circuits. Amplifiers, oscillators, pulse forming and shaping, frequency response, modulation, detection and computer logic circuits. 3 lectures, 1 laboratory. Prerequisite: EE 201

EL 322 Instrumentation and Control Systems (4)

Principles of transducers and instruments. Measurement of pressure, strain, velocity, acceleration, temperature, etc. by means of electric devices. Instrumentation systems and measurement error sources. Principles of automatic control. Control of velocity, acceleration, temperature, etc., by means of feedback control systems. Interrelationships between transducer, power amplifier and actuator. 3 lectures, 1 laboratory. Prerequisite: EL 321

EL 327 Electronic Instrumentation and Measurement (4)

Principles and characteristics of instruments and instrumentation systems; analog and digital transducers; A/D conversion; data and signal transmission and amplification problems. Low level signal, high frequency signal, and high accuracy signal measurement problems. Automated instrumentation systems. 3 lectures, 1 laboratory. Prerequisite: EL 302, 314

EL 341, 342 Networks Laboratory (1) (1)

Experimental study of signal and network characteristics, frequency selective networks, and transmission lines. Use of transmission lines as circuit elements, impedance charts. 1 laboratory. Concurrent: EL 301, 302

EL 343 Analog Computer Laboratory (1)

Laboratory study of analog computers and auxiliary equipment. Solution of engineering problems and simulation of physical systems on the analog computer. 1 laboratory. Prerequisite: EL 314, 301

EL 344, 345 Electronic Circuits Laboratory (1) (1)

Laboratory analysis of principally solid state circuitry comprising voltage current and power amplifiers, tuned and untuned, at audio and radio frequencies. Study of modulated waves and frequency conversion. 1 laboratory. Concurrent: EL 314, 315

EL 346 Electronic Circuits Laboratory (1)

Laboratory analysis of pulse, digital and timing circuits using principally solid state circuitry. Pulse-forming techniques. 1 laboratory. Concurrent: EL 316

EL 347 Electron Devices Laboratory (1)

Fundamental experiments in investigating the physical and electrical properties of semiconductor and electron tube devices. Emphasis on collecting, correlating, graphing, and evaluating laboratory data. 1 laboratory. Concurrent: EL 307

EL 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

EL 401 Electromagnetic Fields (3)

Static and quasi-static fields: laws of Coulomb, Gauss, Faraday, and Ampere. Boundary value problems. Development of Maxwell's equations and the wave equation with emphasis on physical concepts. Investigation of traveling waves in various media. 3 lectures. Prerequisite: EL 207, EE 301

EL 402 Microwave Engineering (4)

Application of Maxwell's equations and boundary value problems, to wave guide structures. Microwave equivalent circuit theorem. Passive microwave devices including treatment of microwave propagation in ferrites. Measurement principles and technique. 3 lectures, 1 laboratory. Prerequisite: EL 401

EL 404 Principles of Digital Computers (3)

Organization of typical digital computer. Combinational and sequential switching circuit analysis and synthesis with emphasis on modern electronic devices used in the design of electronic computers. Properties of modern high-speed memory systems. Coding systems. 3 lectures. Prerequisite: EL 316, 321, or consent of instructor.

EL 405 Advanced Amplifier Theory (4)

Analysis and design of modern electronic amplifiers and amplifier systems with advanced techniques. Pole-zero analysis, wide-band, lowpass and high-frequency, bandpass amplifiers design using Y and S parameters. Noise analysis. 3 lectures, 1 laboratory. Prerequisite: EL 302, 316

EL 406 Communication Theory (3)

A unified treatment of various types of transmission systems with emphasis on the role of system bandwidth and noise in limiting the transmission of information. Single-side-band AM and various types of pulse modulation systems are included. 3 lectures. Prerequisite: EL 302, 316

EL 407 Digital Computer Subsystems (4)

Design of registers, counters, sequencers, accumulators, encoders, decoders, memories, and other computer subsystems. Use of modern techniques and devices in implementation. Consideration given to cost, speed, and dependability. 3 lectures, 1 laboratory. Prerequisite: EL 316, 319

EL 408 Digital Computer Systems (4)

Design and interconnection of various parts of a digital computing system. Survey of various input/output and other peripheral units and problems of interfacing these with the central processing unit. Design of sequential circuits with emphasis on control circuitry required in the main frame of a modern computer. 3 lectures, 1 laboratory. Prerequisite: EL 407, CSc 221 or consent of instructor.

EL 409 Electronic Engineering Reliability (3)

Reliability prediction and reliability design, including redundancy and the allocation problem. Computer reliability prediction and analysis of variability. 3 lectures. Prerequisite: EL 314, Engr 251

EL 411 Passive Network Synthesis (3)

Modern circuit synthesis concepts and methods as applied to typical communication and control systems. Treatment of the approximation problem and techniques of network realization. 3 lectures. Prerequisite: EL 302

EL 412 Analog Computation and Simulation (3)

Development of the concepts of analog computation and simulation, including system modeling, programming and scaling techniques. Application to problems in engineering, and science, including some treatment of non-linear techniques; actual practice. 2 lectures, 1 two-hour activity. Prerequisite: EL 343

Electronic Engineering

EL 420 Solid State Electronics I (3)

Fermi-Dirac statistics, mobility and diffusion in semiconductors, temperature dependence of carrier concentration, continuity equation, effects of doping gradients, metal semiconductor contacts, photovoltaic and thermo-electric effects. 3 lectures. Prerequisite: EL 219, Phys 412

EL 421 Principles of Solid-State Microelectronics (4)

Systems development and reliability considerations. The physical basis of micro-electronics. Properties of surfaces and thin films. Rectification and pn junction systems. Fabrication techniques. Miniature and thin-film circuits. Solid-state circuits and multiple devices. 3 lectures, 1 laboratory. Prerequisite: EL 316

EL 422 Semiconductor Devices and Models (3)

Physical operation of modern semiconductor devices including high frequency, high power, and switching characteristics. Fundamental solid-state mechanisms that contribute to device performance. Modeling theory to relate these mechanisms to usable equivalent circuits. 3 lectures. Prerequisite: Phys 412, EL 316

EL 423 Microwave Electronics (2)

Klystron amplifiers, reflex oscillators, magnetrons, traveling wave tubes, solid state signal sources, masers, and parametric amplifiers. 2 lectures. Prerequisite: EL 401

EL 424 Antenna Theory and Application (3)

Linear antenna theory. The antenna as a matching device. Antenna directivity, gain, efficiency, resistance, aperture, and reciprocity. Application of antenna theory to various types of antennas. Consideration of terrestrial, tropospheric, and ionospheric propagation. 3 lectures. Prerequisite: EL 401, Math 318

EL 425 Active Network Synthesis (4)

Selected topics in modern network synthesis, using active devices as negative impedance converters, to satisfy prescribed one and two-port immittance and transfer functions using only R and C elements. 3 lectures, 1 laboratory. Prerequisite: EL 302, 314

EL 427 Electronic Systems Information Theory (3)

An introduction to information transmission theory and coding theory, covering information and entropy, Markov information sources, code properties, coding theorems; Shannon-Fano Codes, linear codes, hamming codes, continuous channels, Gaussian signals and channels. 3 lectures. Prerequisite: EL 409 or equivalent

EL 436 Microwave Measurements (3)

Transmission line characteristics and measurements. Microwave concepts; techniques of rf field measurements, and microwave transmission line measurements. For Measurement Science majors. 2 lectures, 1 laboratory. Prerequisite: EL 322 or equivalent.

EL 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects results are presented in a formal report. Minimum 120 hours total time. Prerequisite: EL 316, 319

EL 463 Undergraduate Seminar (2)

Discussion of new developments in the fields of communications and industrial electronics, with particular reference to fields of employment. Job analysis. 2 lectures.

EL 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

ENGINEERING

Engr 201 The Role and Function of Engineering in Society (3)

Development of technology and the engineering method. Evaluation of technology, problems and responsibilities of the engineering profession to society, and case studies of significant engineering successes and failures. 3 lectures.

Engr 251 Digital Computer Applications (2)

Programming techniques and procedures with applications to several selected engineering problems from a variety of course situations. Actual problem solutions by means of a digital computer will be required. 2 activities. Prerequisite: Math 142 or 132, Phys 131 or 121

Engr 270 Introduction to Ocean Engineering (3)

Introduction to the engineering description of the ocean environment, measurements, communications, materials, installations and equipment. 3 lectures. Prerequisite: Chem 121, Phys 123, Math 132, a course in Biology.

Engr 410 Engineer Examination Review (2)

Review of engineering fundamentals including mathematics, statics, dynamics, strength of materials, fluid mechanics, electricity, thermodynamics, heat transfer, chemistry, and economics, in preparation for Engineer-in-Training and Professional Engineer examinations. Not acceptable for graduate credit. 2 lectures. Prerequisite: Senior standing in Engineering, Architecture, or Agricultural Engineering.

Engr 438, 439 Systems Engineering (3) (3)

Preliminary design of a complex engineering system. Emphasis on overall problems involved. Requires concentrated study of some aspect or component of the system. Opportunity for creative engineering practice. Written and oral reports made by the entire design team. 3 activities.

Engr 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their field of employment. Project results are presented in a formal report. Minimum 120 hours total time.

Engr 463 Undergraduate Seminar (2)

New developments, policies, practices, and procedures. Each individual is responsible for the development and effective presentation of topics in his area of special emphasis. 2 meetings. Prerequisite: Senior standing.

Engr 500 Individual Study (1-3)

Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Enrollment by petition. Prerequisite: Consent of department head, graduate adviser and supervising faculty member.

Engr 503 Advanced Structural Analysis (3)

Deformations of aircraft structures due to static and dynamic loads. Computation of natural mode shapes and frequencies. Determination of dynamic stress fields in aircraft due to transient motions caused by external forces. 3 lectures. Prerequisite: ME 427 or senior level structural design course.

Engr 504 Vehicular Design (3)

Selected vehicular design problem involving the use of creative and analytical talents, and engineering judgment. 3 lectures. Prerequisite: Engr 503

Engr 505 Theoretical Aerodynamics (3)

Fundamentals of analytical aerodynamics, potential flow, vortex theory, circulation, Kutta Joukowski theorem, lifting line theory, three dimensional lift and drag of wings, performance, stability and control. 3 lectures. Prerequisite: Aero 303 or equivalent.

Engineering

Engr 506 Elements of Rocket Propulsion (3)

Analysis and design of liquid and solid rockets using basic design parameters such as droplet atomization, droplet and partial combustion, heat transfer, combustion stability and control, and thermochemical computations. 3 lectures. Prerequisite: Aero 401 or equivalent.

Engr 507 Fuels and Propellants (3)

Properties of liquid, solid, and gaseous fuels and propellants. Combustion and reaction thermodynamics; theoretical specific impulse computation. Flame theory; ionization and high temperature gas dynamics. 3 lectures. Prerequisite: Graduate standing

Engr 511, 512 Electric Machines Theory (3) (3)

Advanced topics in electric machines theory and design. 3 lectures. Prerequisite: EE 332 or equivalent.

Engr 513, 514 Control Systems Theory (3) (3)

State variables of open loop and closed loop dynamic systems. Mathematical models. Concepts of sensitivity, controllability and observability. Error analysis. Non-linear control analysis and synthesis. Discrete control. Stability by Lyapunov's functions. Adaptive and optimal control. Bellman's dynamic programming and Pontriagin's maximum principle. Random processes, and stochastic control. 3 lectures. Prerequisite: Consent of the instructor.

Engr 515 Control Systems Seminar (3)

Seminar discussion of recent and current literature. One seminar period, 3 or 4 hours. Prerequisite: Engr 514

Engr 516 Advanced Electromagnetic Theory (4)

Interaction of field and matter; reflection and refraction of plane waves; plane waves in plasma; guided waves and wave guides; radiation concept; theory of special relativity. 4 lectures. Prerequisite: EE 302 and Math 404, or equivalents, or consent of the instructor.

Engr 520 Analog Computation and Simulation (3)

Principles and practice of analog computation and simulation; programming and scaling techniques. Application to problems in engineering, mathematics, and physics with emphasis on non-linear techniques including function multiplication and generation, output devices. 2 lectures, 1 two-hour activity. Prerequisite: EL 343 or equivalent.

Engr 521 Digital Systems (3)

Organization of digital systems, primarily the modern general purpose, high speed digital computer; arithmetic units, control units, memories, peripheral equipment. Cost and speed trade-offs in the design of such systems. 3 lectures. Prerequisite: EL 404

Engr 522 Computation Systems (3)

Organization of modern electronic computation systems (digital and analog), their capabilities and limitations. Design and applications of hybrid (analog and digital) computation systems. 2 lectures, 1 two-hour laboratory. Prerequisite: EL 521

Engr 523 Microwave Engineering (3)

Application of Maxwell's equations to wave guide theory. Circuit theory for wave guiding systems. Passive microwave devices including ferrites, cavity resonators, periodic structures and filters. Microwave measurement, principles and techniques. Microwave devices such as klystrons, magnetrons, traveling wave tubes, masers, parametric amplifiers and solid-state sources. 3 lectures. Prerequisite: EL 401 or equivalent.

Engr 525, 526 Advanced Communication Theory (3) (3)

Random processes and spectral analysis. Shot noise; Gaussian processes; linear systems with random inputs. Optimum linear systems; matched filters, optimum filtering (Wiener and Bode-Shannon methods). Non-linear systems with random inputs. Statistical detection of signals. 3 lectures. Prerequisite: EL 309 or Stat 321 or equivalent.

Engr 527 Advanced Network Theory (3)

Circuits, matrices, and linear vector spaces; linear graph theory; state equations for linear networks in normal form; eigenvalues and eigenvectors; reciprocal networks; normal modes. 3 lectures. Prerequisite: EL 302 or equivalent.

Engr 532 Industrial Ventilation and Exhaust Systems (3)

Environmental contamination, dispersion mechanisms, industrial comfort criteria; control of temperature, humidity, cleanliness and motion of air. Natural and forced ventilation, control velocities, air-handling systems and components. 3 lectures. Prerequisite: Graduate standing and consent of instructor.

Engr 533 Aerosol Technology (3)

Definition, theory and measurement of particle properties, particle statistics, size distribution, particle transport, gas cleaning, sampling of airborne contaminants. 3 lectures. Prerequisite: Graduate standing and consent of instructor.

Engr 534 Advanced Design of Air Pollution Control Systems (3)

Comprehensive problems in air conservation. Methods of analysis, design of unit operations and processes for environmental engineering facilities. 3 lectures. Prerequisite: Graduate standing and EnvE 325

Engr 541 Advanced Operations Research (3)

Models for mathematical programming and operations research. Mathematical programming topics in linear programming, network analysis, and dynamic programming. Operations research models will include queuing, inventory models, simulation, and Monte Carlo. Special analysis problems in non-linear programming and integer programming. 3 lectures. Prerequisite: IE 333, Math 219, Stat 322, or consent of instructor.

Engr 542 Reliability Engineering (3)

Theory and techniques for determining the reliability of systems and system elements. Influence of failures in series, parallel, and redundant designs. Failure modes and effects. Frequency distributions of failures and failure rates. Methods of estimating, predicting, measuring, and testing for reliability and effectiveness. 2 lectures, 1 laboratory. Prerequisite: IE 336; Stat 322, 425; or consent of instructor.

Engr 543 Advanced Human Factors (3)

Theory and application of man-machine relations and system design. Concepts of mathematical models, human information input channels, decision making based on capability of human operator. 2 lectures, 1 laboratory. Prerequisite: IE 435, Psy 202, Stat 321, a course in biology, graduate status, or consent of instructor.

Engr 550 Kinematic Analysis and Design (3)

Analysis and design of mechanical linkages by means of geometric and algebraic methods. Optimization studies. 3 lectures. Prerequisite: ME 324 or equivalent.

Engr 551 Mechanical Systems Analysis (3)

Specific mechanical systems by means of mathematical models and/or physical models; pertinent variables. 3 lectures. Prerequisite: Consent of instructor.

Engr 552 Conductive Heat Transfer (3)

Theory of steady-state and transient conduction in isotropic and anisotropic media. Development of differential equations, solutions by series, conformal mapping, transforms, finite differences. Concentrated and distributed heat sources. 3 lectures. Prerequisite: Env E 313, Math 318

Engineering

Engr 553 Convective Heat Transfer (3)

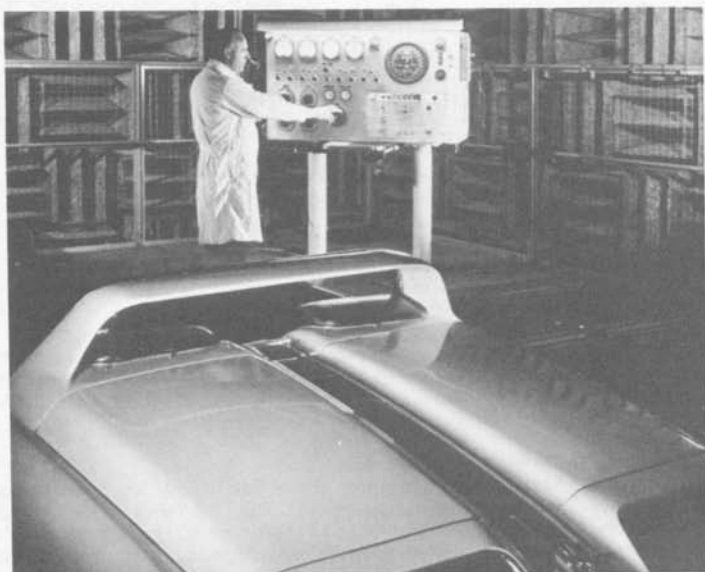
Analysis of convective transfer of energy, mass and momentum. High speed flow and ablation. Phase change heat transfer. 3 lectures. Prerequisite: Env E 313, ME 342, Math 318

Engr 556 Stability of Structural Systems (3)

Static and dynamic analysis of structural and mechanical systems, stability analysis by solution of differential equations, energy methods, perturbation methods. Buckling of columns, torsional buckling, dynamic buckling. 3 lectures. Prerequisite: Consent of instructor.

Engr 561 Electronic Processes in Metals (3)

Nature of metallic bond, band theory, role of Fermi surfaces, electrical and magnetic properties, semimetals, superconductors, liquid metals. 3 lectures. Prerequisite: Phys 412 or 452



Engr 562 Mechanical Metallurgy (3)

Analysis of stress and strain in solids; elements of theory of elasticity and plasticity, and their applications to metal forming. Residual stresses, theory of dislocations, theory of recrystallization, effects of temperature and rate of loading; fracture mechanics, fatigue and creep. 3 lectures. Prerequisite: WM 306 or consent of instructor.

Engr 563 Metallurgical Physical Chemistry and Thermodynamics (3)

Theory and application of metallurgical, physical, chemical, and thermodynamic principles to solid state reactions. Behavior of metals and materials. 3 lectures. Prerequisite: Chem 305, 306, ME 302 or equivalent, or consent of instructor.

Engr 564 Theory of Stress Corrosion Cracking (3)

Stress corrosion cracking, hydrogen embrittlement, liquid metal embrittlement, corrosion fatigue, and other failure modes induced by specific environment. 3 lectures. Prerequisite: WM 424, Chem 306, ME 212

Engr 599 Design Project (Thesis) (2) (2) (5)

Each individual or group will be assigned an industrial design project for solution under faculty supervision as a thesis requirement for the Master of Engineering degree. An appropriate experimental or analytical thesis may be accepted.

ENGINEERING TECHNOLOGY

ET 121 Air Conditioning and Refrigeration Principles (4)

Introduction to principles of commercial and industrial air conditioning and refrigeration systems. Installation, service maintenance, and cost estimating. 3 lectures, 1 laboratory. Prerequisite: Phys 121

ET 122, 123 Environmental Graphics (2) (2)

Principles and practices of mechanical and architectural graphics applied to the development of the spatial concepts essential to the design and installation of environmental systems. 1 lecture, 1 laboratory.

ET 124 Elements of Electronics (3)

Fundamentals of electronic components and unit circuits. Application of unit circuits in electronic systems. Introduction of electronic instrumentation and industrial control. Properties of components and functions of basic circuits. Introduction to both the analog and digital computers with application to engineering problems. 2 lectures, 1 laboratory.

ET 125 Electronic Instrument Practices (4)

Analysis of selected electronic instruments and transducers, their application in the field of measurement. Testing for and repair of malfunctioning equipment. Instrumentation used in measuring voltage, current, waveform, frequency and phase. 3 lectures, 1 laboratory. Prerequisite: ET 124

ET 131 Introduction to Engineering Drafting (1)

Basic instruction in drafting techniques and equipment. Geometric constructions for drafting. Basic principles and practices of isometric, oblique, and multiview drawing systems. 1 laboratory.

ET 137 Elements of Machinery (3)

Selection of mechanical fasteners, fittings, chains, belts. Assembly and adjustment of precision components, lubrication and servicing of complex machinery. 2 lectures, 1 laboratory.

ET 141 Applied Descriptive Geometry (2)

Graphical solutions of problems involving points, lines and planes in three-dimensional space by method of multiview projection. Intersections and development of geometric solids. Application to engineering design. 2 laboratories. Prerequisite: One year of high school drafting or ET 131

ET 142 Engineering Drawing Systems (2)

Multiview and pictorial drawing. Detail and assembly drawings. Conventional industrial drafting practices including sectioning and dimensioning techniques. Role of the engineer in current industrial drafting organizations. 2 laboratories. Prerequisite: ET 141

ET 143 Engineering Graphics (2)

Vector diagrams. Gears and cams. Graphical mathematics. Functional scales. Introduction to alignment charts and monograms. Industrial drafting systems and practices. Interpretation of specialized types of technical drawings, including architectural, structural, welding, piping, diagrammatic and electrical. 2 laboratories. Prerequisite: ET 142

ET 151 Fundamentals of Technical Drawing (2)

Basic theory and application of multiview and pictorial projection. Current industrial practices and standards. Includes sectioning, techniques of dimensioning, detail drawings, and assembly drawings. Freehand sketching and interpretation of engineering drawings. 2 laboratories. Prerequisite: High school drafting or ET 131

Engineering Technology

ET 153 Interpretation of Technical Drawings (1)

Basic principles of technical drawing. Reading drawings made by multiview and pictorial projections systems. Interpretation of specialized types of technical drawings including electrical, diagrammatic, architectural, structural. Current industrial symbols and standards. Freehand sketching techniques. 1 laboratory.

ET 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

ET 201 Air Conditioning and Refrigeration Codes (2)

Introduction to current federal, state, and local codes for equipment and human safety as applied to building plumbing, heating, ventilating, refrigeration, and air conditioning systems. 2 lectures.

ET 231 Basic Circuit Analysis (4)

Application of experimental laws to basic linear passive networks. Introduction to mechanical analogues of electrical parameters. Transformer principles. Analysis of natural and forced response in networks; application of theorems, graphical solutions, handbook data, and approximations. Laboratory observation and measurement of circuit response. 3 lectures, 1 laboratory. Prerequisite: EL 132, Math 131

ET 232 Electronic Circuits and Devices (4)

Solid state devices in various circuits. Common base emitter and collector transistor configuration; power, voltage, and current gain from device and circuit parameters. Circuit response; measurement techniques. 3 lectures, 1 laboratory. Prerequisite: ET 231

ET 233 Electronic Devices I (4)

Modern electronic devices and application to amplifier circuits. Use of characteristic curves. Square wave and pulse response. Distortion analysis. Amplifier operation; practical measurement techniques. 3 lectures, 1 laboratory. Prerequisite: ET 232

ET 235 Nondestructive Testing (5)

Application of nondestructive test systems for quality control of welded structures and castings. Includes radiography, ultrasonic, magnetic particle, penetrants, and eddy current methods. 3 lectures, 2 laboratories. Prerequisite: WM 359

ET 236 Welding Power Sources (3)

Design, selection, and application of welding power sources. Physics of the welding arc as related to power supply. 2 lectures, 1 laboratory. Prerequisite: ET 235

ET 237 Hydraulic Device Applications (4)

Flow diagrams with Joint Industrial Council standards, hydraulic and pneumatic components, sequence logic and travers limit controls. Selection of pumps and distribution of fluid power; fluid damping of mechanical shock. 3 lectures, 1 laboratory. Prerequisite: ET 137, Phys 123

ET 240 Additional Engineering Technology Laboratory (1-2)

Elective project work. Total credit limited to 4 units with not more than 2 units in any quarter. 1 or 2 laboratories.

ET 246 Engineering Drawing (2)

Fundamental principles and practices in construction drawings, piping, welding and topographic drawing. Special projects in the area of major interest. Application to current industrial methods and systems. 2 laboratories. Prerequisite: ET 142

ET 313 Plumbing and Building Sanitation (3)

For students in the School of Architecture and Environmental Design. Calculation of water supply and consumption. Fire protection and sprinkler systems. Plumbing and drainage. Gas services. Application of principles to specific elements of engineering structures. 3 lectures.

ET 320 Mechanisms (4)

Motion of machine parts. Graphical methods for determining displacements, velocities, and accelerations in linkages, cams, gears, and other mechanical assemblies. 2 lectures, 2 two-hour laboratories. Prerequisite: Phys 121, ET 142

ET 321 Air Distribution Systems (3)

Materials and techniques in fabrication and installation of air ducts for heating, ventilating, refrigerating, and air conditioning. Introduction to fabrication of air handling equipment and related accessories for high and low velocity systems. 1 lecture, 2 laboratories. Prerequisite: EnvE 233 or ME 231

ET 324, 325, 326 Advanced Welding Technology (5) (4) (4)

Problems in welding carbon and low alloy steels, loads, and stresses. Difficulties and corrective measures. Problems in welding of nonferrous metals and alloys. Selection of joining processes. Welding metallography. 3 or 2 lectures, 2 laboratories. Prerequisite: ET 236

ET 331, 332 Refrigeration Systems (3) (3)

Operation, installation, and supervision of medium and low temperature refrigeration systems for food and product processing and storage using various staging systems. Cold storage and building requirements for efficient operation. Low temperature testing and cryogenic refrigeration. Transport refrigeration systems. 2 lectures, 1 laboratory. Prerequisite: EnvE 233

ET 337 Instrumentation of Mechanical Systems (3)

Remote reading and control devices, position indicating, automatic warning, primary servo-systems. 2 lectures, 1 laboratory. Prerequisite: ET 237

ET 341 Electronic Devices II (4)

Application of electronic devices. Oscillation, and principles of feedback. Junction transistors at high frequencies. Integrated circuits and operational amplifiers, transistor multivibrators. The transistor as a switch. Wave shaping circuits. Responses in electronic circuits; practical measurement techniques. 3 lectures, 1 laboratory. Prerequisite: ET 233

ET 342 Communication Systems (4)

Communication systems; AM, FM, SSB and pulse modulation techniques. Introduction to transmission lines and antennas. 3 lectures, 1 laboratory. Prerequisite: ET 341

ET 344 Advanced Design Graphics (2)

Preparation of design layouts. Detail and assembly drawings for production. Dimensioning theory as applied to modern engineering practices including numerical control systems. 2 laboratories. Prerequisite: ET 142

ET 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation of techniques, studies or laboratory applications of selected problems. Total credit limited to 4 units, with maximum of 2 units per quarter. Prerequisite: Permission of department head.

ET 421, 422 Applied Machine Design (4) (4)

Machine design emphasizing graphical techniques, feasibility models, and utilization of standard and special elements. Laboratory includes solution of realistic design projects by student teams. 2 lectures, 2 laboratories. Prerequisite: ET 344, 320; Aero 202

ET 423 Air Conditioning Systems (5)

Application of complete air conditioning consisting of heating, ventilation, humidification, dehumidification, refrigeration, air purification, water treatment, and control equipment for commercial and industrial applications. 3 lectures, 2 laboratories. Prerequisite: ET 332

Engineering Technology

ET 434, 435, 436 Welding Design (3) (3) (3)

Design of welded structures, containers, bases, tanks and pressure vessels according to governing codes, specifications and procedures, cost estimating of steel fabrication, process selection and evaluation. 1 lecture, 2 laboratories. Prerequisite: ET 326

ET 437 Mechanical Component Selection (4)

Design of housings, frames, chassis; selection of bearings, clutches, brakes; cost estimating and weight analysis; emphasis on logical arrangement of machine components within basic mechanical structure. 2 lectures, 2 laboratories. Prerequisite: ET 337, Aero 202, WM 235

ET 439 Instruments and Controls (3)

Application of instrumentation and automatic controls to heating, ventilation and air conditioning systems. 2 lectures, 1 laboratory. Concurrent: ET 331

ET 441 Digital Circuits (4)

Generation of pulses, their shaping, timing, and transmission. Mechanization of logic. Microminiature circuits. Digital circuit responses. 3 lectures, 1 laboratory. Prerequisite: ET 341

ET 442 Automation Technology (4)

Electronic and electromechanical systems used in servomechanisms. Open and closed loop frequency response. Bode plots. Introduction to root locus. Amplification and control systems for automatic control of sequential and continuous processes. 3 lectures, 1 laboratory. Prerequisite: ET 341, ME 206



ET 443 Microwave Technique (4)

Electromagnetic field theory; microwave devices. Klystron amplifiers, reflex oscillators, magnetrons, traveling wave tubes, solid state signal sources, masers and parametric amplifiers. 3 lectures, 1 laboratory. Prerequisite: ET 342

ET 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects are typical of problems graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: Senior standing.

ET 463 Undergraduate Seminar (2)

Special studies and technical developments in the field. Individual reports on important technology in the engineering technology field. 2 meetings.

ET 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

ENGLISH

Eng 100 Applied English Composition (3)

Concentrated work in English composition, letter writing, reports, and language usage. May not be substituted for Eng 104 or Eng 105. Not open for credit to students with credit in college English. 3 lectures.

Eng 104 Freshman Composition (3)

Composition based on principles, practice, and correction of theme writing. Organization, content, and editing of sentences, paragraphs, and whole essays. Forms of writing, accenting exposition. Supplementary language study. 3 lectures. Prerequisite: Satisfactory score on placement test.

Eng 105 Freshman Composition (3)

Continuation of written composition. Use of logic and argument; forms of persuasive writing. Use of reference materials in the preparation of an original, effective library research paper. Readings for critical analysis. 3 lectures. Prerequisite: Eng 104

Eng 106 Freshman Composition (3)

Continuation of written composition with emphasis on the development of style in writing (clarity, grace, individuality). Reading of good examples of style; writing of critical analysis papers. 3 lectures. Prerequisite: Eng 105

Eng 201 Introduction to Fiction (2)

Understanding of the forms of fiction through guided class discussion of short stories and novels. Frequent written assignments. 2 lectures.

Eng 202 Introduction to Drama (2)

Understanding of the forms of drama through guided class discussion of plays. Frequent written assignments. 2 lectures. Prerequisite: Eng 104

Eng 203 Introduction to Poetry (3)

Understanding of the forms of poetry through guided class discussion of poems. Frequent written assignments. 3 lectures. Prerequisite: Eng 105

Eng 205 Children's Literature (3)

Survey of stories, plays, and poems which are suitable for introducing literary values in the elementary grades. 3 lectures. Prerequisite: Eng 106 or consent of instructor.

Eng 207 Introduction to Literature (3)

Introduction to major forms of literature. Study in depth of selected works with reading for appreciation. May not be elected by English majors. 3 lectures. Prerequisite: Eng 104

Eng 208 Introduction to American Literature (3)

Selected reading from representative American authors. May not be elected by majors in English. Not open for credit to students with credit in Eng 311, 312, or 313. 3 lectures. Prerequisite: Eng 104

Eng 210 Introduction to Shakespeare (3)

Selected readings in Shakespeare. Course is designed for General Education. 3 lectures. Prerequisite: Eng 105

Eng 211, 212, 213 European Literature (3) (3) (3)

Directed readings in European literature from the Greeks and Romans to the present, exclusive of the British. 3 lectures. Prerequisite: Eng 104

Eng 214 Afro-American Literature (3)

Selected readings in Afro-American literature. 3 lectures. Prerequisite: Eng 104

Eng 215 Mexican-American Literature (3)

Selected readings in Mexican-American literature in translation. 3 lectures. Prerequisite: Eng 104

English

Eng 218 Report Writing (3)

Study of the research paper in industry and engineering. Extensive writing experience. 3 lectures. Prerequisite: Eng 105

Eng 219 Technical Writing (3)

Preparation of training materials; popular presentation of technical data and conclusions; technical communication within industries. Extensive technical writing. 3 lectures. Prerequisite: Eng 104

Eng 300 Advanced Composition (3)

Application of grammatical and rhetorical principles to writing. Production of clear, well-planned, effective prose. 3 lectures. Prerequisite: One year of English composition.

Eng 301 Modern English Grammar (3)

English language: phonology and morphology, dialects, language and literacy, coding practices and problems. 3 lectures. Prerequisite: Eng 105

Eng 302 Modern English Grammar (3)

English language: syntax; comparison and contrast of the syntax of spoken and written English. Methods of syntactical study: traditional, descriptive-structural, transformational-generative. 3 lectures. Prerequisite: Eng 301

Eng 303 History of the English Language (3)

A study of the development of the English language from its origins to its present forms and practices. Required of all English majors. 3 lectures. Prerequisite: Eng 106, 307, 308, 309

Eng 304 Advanced Composition—Non-Fiction (3)

Instruction and practice in writing, revising, and evaluating various forms of non-fiction. 3 lectures. Prerequisite: Eng 106

Eng 305 Advanced Composition—Imaginative Writing (3)

Instruction and practice in writing, revising, and evaluating various kinds of imaginative composition. 3 lectures. Prerequisite: Eng 106, 201

Eng 306 Advanced Composition—Literary Criticism (3)

Instruction and practice in writing, revising, and evaluating various types of critical writing. 3 lectures. Prerequisite: Eng 106, 201, 202, 203

Eng 307, 308, 309 British Literature (3) (3) (3)

Selected readings in British literature from the beginning to the mid-20th century. 3 lectures. Prerequisite: Eng 105

Eng 311, 312, 313 American Literature (3) (3) (3)

Directed readings in American writers from Colonial times to the present. 3 lectures. Prerequisite: Eng 105

Eng 316 Readings for Young Adults (3)

A survey of readings in literature, suitable for use in secondary schools. 3 lectures. Prerequisite: Eng 106

Eng 317 Modern Drama (3)

A survey of British and American Drama of the 20th century. 3 lectures. Prerequisite: Eng 202

Eng 319 The Bible as Literature (3)

The Old and New Testaments with historical background. Literary forms and characteristics of Hebraic writing. Appreciation of the far-reaching use of Biblical narrative and reference in literature, speeches, art, drama, and modern film. 3 lectures.

Eng 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

Eng 414 Significant World Writers (3)

Study in depth of selected world writers, as individual writers or in groups. Each course will have a subtitle descriptive of the content. May be repeated to 12 units. 3 lectures. Prerequisite: Eng 211

Eng 415 Modern Novel (3)

Readings in representative 20th century novels with special emphasis on origins, form, style, and ideas. 3 lectures. Prerequisite: Eng 201 or 9 units of literature.

Eng 416 Modern Poetry (3)

Study of poetry as an art expression of the 20th century. 3 lectures. Prerequisite: Eng 203 or 9 units of literature.

Eng 417 Significant British Writers (3)

Study in depth of selected British writers, as individual writers or in groups. Each course will have a subtitle descriptive of the content. May be repeated to 12 units. 3 lectures. Prerequisite: Eng 307, 308, 309

Eng 418 Significant American Writers (3)

Study in depth of selected American writers, as individual writers or in groups. Each course will have a subtitle descriptive of the content. May be repeated to 9 units. 3 lectures. Prerequisite: Eng 311, 312, 313 or consent of instructor.

Eng 419 Elizabethan Drama (3)

A survey of the English drama from its beginning to 1642, excluding Shakespeare. 3 lectures. Prerequisite: Eng 202, 307

Eng 461 Senior Project (2)

Selection and completion of a project under faculty supervision. Projects typify problems which a graduate may face in his field of employment. Project results are presented in a formal written report. Minimum 60 hours total time.

Eng 463 Undergraduate Seminar (2)

Study of professional articles and materials, research methodology and bibliography, professional orientation. 2 lectures. Prerequisite: Senior standing.

Eng 501 Introduction to Graduate Study (2)

Introduction to graduate scholarship and research in literature, language and composition. Research methodology and bibliographic techniques. May not be elected where credit for Eng 463 has been earned. 2 lectures. Prerequisite: Graduate status in English.

Eng 502 Introduction to Critical Analysis (3)

Basic approaches used by critics. Multiple points of view; application to literary works; reflection of critical analysis in student compositions. Designed to aid the teacher of secondary English to enrich the courses taught in secondary schools. 3 lectures. Prerequisite: graduate standing.

Eng 503 Contemporary Language Study (3)

Correlation between current development of English language and courses in grammar and composition in public schools. Usage, vocabulary, spelling, idiom, punctuation, grammar, sentence structure. Understanding of effects of language change upon writing and speaking. Suitable for upper grade, junior and senior high school teachers. 3 lectures. Prerequisite: Eng 302, or consent of instructor.

Eng 504 Problems in Language (3)

Study of development of English; consideration of problems of grammar and uses of language. May be repeated to 9 units. 3 lectures. Prerequisite: Eng 503

English/Entomology/Environmental Engineering

Eng 505 Problems in Composition (3)

Study of special problems in composition. Direct application of new language information to composition or detailed analysis of relationship between rhetorical principles and writing. May be repeated to 9 units. 3 lectures. Prerequisite: Graduate status in English.

Eng 511 Problems in American Literature (3)

Concentrated study of American authors or periods. Written and oral reports of individual investigation. May be repeated to 9 units. 3 lectures. Prerequisite: Graduate status in English.

Eng 512 Problems in British Literature (3)

Concentrated study of British authors or periods. Written and oral reports of individual investigation. May be repeated to 9 units. 3 lectures. Prerequisite: Graduate standing in English.

Eng 521 Curriculum and Methods in English (3)

Instruction in composition and literature as they may be applied to secondary school teaching. 3 lectures. Prerequisite: Admission to teacher education program or graduate status.

Eng 590 Graduate Seminar in English (1-3)

Independent or group study of special problems in selected areas of language, composition, or literature. Total credit limited to 3 units. 1-3 lectures. Prerequisite: Graduate status in English.

ENTOMOLOGY

Ent 126 General Entomology (4)

Introduction to the study of insects. Structure, major orders and families of insects, life histories, economic importance and control. Insect collection required. 3 lectures, 1 laboratory.

Ent 227 Insect Morphology (4)

Morphology of exoskeleton, appendages and internal organs; direct applications of principles are emphasized with economically important insects. 2 lectures, 2 laboratories. Prerequisite: Ent 126

Ent 332 Economic Entomology (3)

Identification, life histories and control of insects beneficial or injurious to various crops, fruits, stored products, domestic animals and man; important invertebrates such as mites, ticks and spiders. 1 lecture, 2 laboratories. Prerequisite: Zoo 132 or Bot 122; Ent 126; Chem 226 or consent of instructor.

Ent 421 Immature Stages of Insects (4)

Identification, biology, and economic importance of preimaginal insect forms. 2 lectures, 2 laboratories. Prerequisite: Ent 126, Bio 325

Ent 590 Seminar in Entomology (1)

Problems and topics in advanced entomology selected according to the interest and needs of the students enrolled. Maximum of 3 units. 1 lecture. Prerequisite: Graduate status and evidence of satisfactory preparation in entomology.

ENVIRONMENTAL ENGINEERING

EnvE 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

EnvE 201 Heating and Ventilating (3)

Heating and ventilating equipment and its application to industrial and public buildings. 3 lectures. Prerequisite or concurrent: Chem 121 or 124, Phys 122 or 132

EnvE 202 Heating and Ventilating (2)

Heating and ventilating equipment and its application to industrial and public buildings. 2 lectures. Prerequisite: EnvE 201

EnvE 203 Environmental Engineering Measurements (2)

Experimental studies of the instrumentation and basic measurements of concern to the environmental engineer. Procedures used in the analysis and reporting of experimental data. Corollary concepts of basic physical phenomena. 1 lecture, 1 laboratory. Prerequisite: EnvE 202

EnvE 231, 232, 233 Fluid Systems (2)(2)(2)

Materials, equipment, principles, and techniques used in designing and installing environmental fluid flow systems. 1 lecture, 1 laboratory. Prerequisite or concurrent: (231) Phys 122 or 132; (232) Chem 121 or 124

EnvE 237 Boilers and Steam Equipment in Agriculture (2)

The operation and maintenance of steam equipment as applied to the agricultural industry. Course designed for students in Agriculture. 2 lectures.

EnvE 240 Additional Engineering Laboratory (1-2)

Elective project work. Total credit limited to 4 units with not more than 2 units in any quarter. 1 or 2 laboratories.

EnvE 302 Thermodynamics of Refrigeration (3)

Thermodynamic analysis of basic power and refrigeration cycles. Thermodynamic analysis of various vapor compression refrigeration systems and components. Combustion. 3 lectures. Prerequisite: ME 302, Chem 125

EnvE 303 Advanced Thermodynamics of Refrigeration (3)

Thermodynamic and heat transfer analysis of vapor compression system components and system balance. Refrigerants. Low temperature refrigeration. Absorption, air and ejector cycles. 3 lectures. Prerequisite: EnvE 302

EnvE 304 Thermodynamics of Processes (3)

Material balances, energy balances, liquids and mixtures, vapor-liquid equilibria, solubility and absorption, equilibrium in chemical reactions. 3 lectures. Prerequisite: ME 302; Chem 126 or permission of instructor.

EnvE 306 Survey of Heating and Air Conditioning (3)

Basic principles concerning comfort, thermal types of equipment and systems, space requirements and energy sources. Course designed for students not majoring in Environmental Engineering. 3 lectures. Prerequisite: Phys 131

EnvE 307, 308 Noise and Vibration Control (2)(2)

Behavior of sound waves, selection of instrumentation, practical measurements, criteria for noise and vibration control in environmental systems. 2 lectures. Prerequisite: Phys 133, Math 241

EnvE 313 Heat Transfer (3)

Basic principles of heat transfer, radiation, conduction, convection in gases and liquids, boiling and condensing of fluids during forced and gravity flow conditions. 3 lectures. Prerequisite: ME 302

EnvE 316 Automatic Process Control (2)

Introduction to automatic control instrumentation. Graphical method for analysis of control systems. Analytical determination of control response. 2 lectures. Prerequisite: Math 318, ME 302

EnvE 324 Introduction to Air Pollution (3)

Causes and effects of air pollution on the individual, the community and industry. Legal and public relations aspects. For non-majors. 3 lectures. Prerequisite: Junior standing.

Environmental Engineering

EnvE 325 Environmental Air Quality (3)

Consideration of ambient air contamination inside and outside of a control space. Factors included in establishing, monitoring and maintaining air quality standards. 3 lectures. Prerequisite: Chem 125. Concurrent: ME 302

EnvE 326 Air Pollution Measurements (3)

Planning and conduct of atmospheric surveys. Collection, evaluation, and interpretation of data as they pertain to the concentration of pollutants sampled. 2 lectures, 1 laboratory. Prerequisite: Chem 126, EnvE 325

EnvE 327 Introduction to Water Pollution (3)

Sources of pollution. Water quality standards. Principle techniques and operations applicable to liquid waste disposal systems. Application of theory of mixing, filtration, fluid flow, sedimentation, filtration, and heat transfer to systems design and pollution control. 3 lectures. Prerequisite: Bio 101, Chem 124. Concurrent: Math 141

EnvE 328 Meteorology (3)

Weather instruments; insolation, convection and advection; land and sea breezes; fog, smogs, clouds, and showers; thunderstorms; lapse rate and temperature inversions; cyclones; anti-cyclones; tornadoes and waterspouts; stacks and plumes; meteorological conditions under which air pollution accumulates. 2 lectures, 1 laboratory. Prerequisite: Phys 122 or 132

EnvE 329 Waste Treatment and Disposal (4)

Properties and characteristics of domestic and industrial liquid wastes. Systems and processes used in treatment. Effluent quality and relation to water pollution control. Methods of solid waste disposal; sampling and analysis techniques; chemical and physical changes. Cost considerations. Site visits. 3 lectures, 1 laboratory. Prerequisite or concurrent: EnvE 327

EnvE 330 Environmental Quality Control (3)

Aspects of the total environment. Application of scientific and engineering principles to control the development and use of air, water and land resources. Control of the pollution of the environment. Disposal of wastes. Administrative and legal aspects. 3 lectures. Prerequisite: Junior standing

EnvE 331, 332, 333 Thermal and Fluids Laboratory (2)(2)(2)

Laboratory tests in controls, thermodynamics, fluid flow, heat transfer, and vibration. Performance testing of refrigeration systems, evaporators, condensers, fans, air washers, boilers, grilles, etc. 1 lecture, 1 laboratory, fall and winter; 2 laboratories, spring. Prerequisite: EnvE 202, 232

EnvE 341, 342, 343 System Design (2)(2)(2)

Individual and team project work in designing systems for heating and refrigerating applications. 2 laboratories. Prerequisite: EnvE 202. Concurrent: EnvE 307; ME 302

EnvE 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

EnvE 401 Advanced Mass and Energy Transfer (3)

Thermodynamic properties of moist air. Humidity measurements, direct contact transfer processes, heating and cooling by extended surfaces, solar radiation. 3 lectures. Prerequisite: EnvE 313

EnvE 402 Advanced Fluid Mechanics (3)

Fluid dynamics and fluid machinery. Centrifugal and axial fans, pumps and compressors. Turbines. Fluid flow in ducts. 3 lectures. Prerequisite: ME 341, EnvE 401

EnvE 411 Air Pollution Control (3)

Theory, principles and practices related to the control of particulate emissions. Mechanical separations. Cost and design of control systems. 3 lectures. Prerequisite: EnvE 326

EnvE 421 Advanced Air Pollution Control (3)

Theory, principles and practices related to the control of gaseous emissions. Process characteristics. Odor control. Mass transfer operations as applied to environmental control. 3 lectures. Prerequisite: EnvE 411

EnvE 422 Environmental Radiation Surveillance (2)

Sources of radioactive contaminants, biological effects, radiation protection. Environmental sampling and analysis of airborne radiation. Controls and disposal of wastes. 2 lectures. Prerequisite: EnvE 421

EnvE 423 Industrial Environments (2)

Effects of the environment in relation to health and the performance of work. Adverse and favorable temperatures and pressures, atmospheric impurities, toxicants. Control of occupational hazards and disease. 2 lectures. Prerequisite: EnvE 421

EnvE 441, 442, 443 Advanced System Design (2)(3)(3)

Individual and team project work in designing systems for air conditioning. 2 laboratories; 1 lecture, 2 laboratories. Prerequisite: EnvE 313, 341, ME 341

EnvE 461, 462 Senior Project (2)(2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum of 120 hours total time.

EnvE 463 Undergraduate Seminar (2)

Special studies and technical developments in the field. Individual reports on important research in the environmental engineering field. 2 lectures.

EnvE 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

FARM MANAGEMENT

FM 101 Introduction to Agricultural Economics (5)

Modern economic system, history of U.S. Agriculture, agriculture's role in the economy, prices of agricultural products, marketing agricultural products, agricultural credit and finance, agricultural resources and land use, the role of farm management, introduction to farm management analysis processes, agriculture and the government. May not be substituted for Ec 211, 212 or FM 305. 4 lectures, 1 2-hour laboratory. To be taken by technical students.

FM 102 Farm Records and Management (4)

Farm recordkeeping for income tax purposes and study of farm business, measures of farm profits, factors affecting farm profits, reorganization of an actual farm. May not be substituted for FM 321 or 322. 3 lectures, 1 2-hour laboratory. To be taken by technical students.

FM 103 Farm Management Problems (5)

Crop and livestock enterprise costing, equipment costing and efficiency, determination of most profitable crop combinations, most profitable application of inputs, labor management, government price programs. May not be substituted for FM 421, 424, 425, or 426. 3 lectures, 2 2-hour laboratories. Prerequisite: FM 102. To be taken by technical students.

Farm Management

FM 124 Agriculture (3)

Identification and use of major crops and livestock, types of farming in the United States, the place and function of the farm marketing system, broad classes of soil and their general management problems, the farm problem as it affects farmers and citizens, identification of plants for the home and their general care. 2 lectures, 1 2-hour laboratory. For nonagriculture majors only.

FM 203 Agricultural Economic Analysis (3)

Role of price in the economy, the firm as a decision-making unit, the production function, single input-output analysis, substitution relationships, products combinations, risk analysis, consumption and market demand influence, population and technological changes. 3 lectures. Prerequisite: Ec 212

FM 300 Successful California Farms (1)

Visits to successful California farms involving many types of farming. Study of farm resources and organization, techniques of operation, yields, problems. Different regions visited on different trips. Maximum credit is 3 units for three different trips.

FM 305 Agricultural Resources (3)

Survey of agricultural production areas of United States from standpoint of physical resource, markets, economic advantages, and problems. Appraisal of area problem from standpoint of land economic principles. 3 lectures. Prerequisite: Ec 201 or 211

FM 307 World Agricultural Resources (3)

World agricultural production areas with emphasis on natural and human resources, existing production, economic implications, population growth and potential food supply. 3 lectures. Prerequisite: Ec 201 or 211

FM 310 Farm Credit (3)

Principles of farm financial management, credit requirements, choosing among sources of credit, farm financial planning and cash flow budgeting. 3 lectures. Prerequisite: Actg 131 or FM 321

FM 315 Land Economics (3)

Supply of land, population pressure on land, input-output relations affecting land use, economic returns, land values, development and investment costs, locational factors, conservation, institutional factors, leasing, land use planning, taxation, public regulations. 3 lectures. Prerequisite: Ec 201 or 211

FM 321 Farm Records (4)

Fundamentals of record keeping, kinds of records, inventory, depreciation, cash and accrued basis of income tax reporting, balance sheet, operating statement, analysis of statements. 3 lectures, 1 2-hour laboratory. Prerequisite: Ec 201 or 211

FM 322 Principles of Farm Management (4)

The role of farm management, types of farming, problems of leasing and buying a farm, labor problems, measures of profits, factors affecting profits, budgeting of laboratory farms, independent analysis of farm for term report. 3 lectures, 1 2-hour laboratory. Prerequisite: FM 321 or Actg 131 and 132

FM 325 California Agriculture (3)

Agricultural regions of California considered from standpoint of physical resources, crops and livestock, size, tenure, water problems, relation to urban areas, land development. 2 lectures, 1 2-hour laboratory. Prerequisite: Ec 201 or 211

FM 326 Farm Appraisal (4)

Methods of farm appraisal, use of county records, appraisal practice on different types of farms, discussions with professional appraisers. 3 lectures, 1 2-hour laboratory. Prerequisite: Ec 211 and junior standing

FM 333 Agricultural Price Analysis (3)

Application of statistical tools for price analysis. Emphasis on price making process for specific agricultural commodities. Utilization of market reports and production estimate data in price forecasting and analysis. 2 lectures, 1 2-hour laboratory. Prerequisite: Stat 212

FM 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

FM 403 Agricultural Prices and Policy (3)

Price making process, price variation and trends, governmental price control programs, price characteristics and problems of specific agricultural commodities. 3 lectures. Prerequisite: Ec 201 or 211

FM 405 Linear Programming in Agriculture (3)

Application of linear programming to modern commercial agriculture; assumptions and data requirements; graphic and simplex solutions; modification of basic assumptions to avoid program restrictions; price and resource mapping; preparation, coding and solutions of models simulating current problems. 2 lectures, 1 2-hour laboratory. Prerequisite: Ec 201 or 211

FM 406 Advanced Agricultural Economic Analysis (3)

Basic mathematical concepts; marginal analysis; maximization, minimization and basic differential calculus, decision and game theory as it pertains to the agricultural firm. 3 lectures. Prerequisite: FM 203, Math 212

FM 421 Crop Management Problems (3)

Crop enterprise costing procedure, analysis of rotation systems, labor problems, irrigation plans, determination of most profitable rates of fertilization and irrigation, marketing crops, land development costs, effect of shifting cropping plan. 3 lectures. Prerequisite: FM 322

FM 424 Poultry Husbandry Management Problems (3)

Poultry enterprise costing procedure, economics of plant layout, analysis of labor saving equipment and procedure, determination of most profitable feed combination, credit for poultrymen, use of outlook reports, marketing methods. 3 lectures. Prerequisite: FM 322

FM 425 Livestock Management Problems (3)

Costing procedure for animal enterprises, types of beef operations compared, feed lot management problems, determination of most profitable feed rations, livestock marketing procedure, effect of feed resource changes on organization and profits. 3 lectures. Prerequisite: FM 322

FM 426 Dairy Management Problems (3)

Dairy enterprise costing procedure, relation of cropping plan to dairy organization, analysis of feed resource costs, determination of most profitable feed rations, costs and problems of shifting from grade B to grade A dairy, most profitable culling. 3 lectures. Prerequisite: FM 322

FM 430 Orientation to California Agriculture (6)

Study of California agriculture through visitation to major production areas of the State. Problems in connection with organization, management, production practices, marketing procedures, use of equipment, soils, climate, and irrigation are considered. Offered in summer only. Open only to agricultural majors. Prerequisite: Senior standing or permission of Dean of Agriculture.

FM 431 Large Farm Accounting (3)

Application of commercial accounting process to large farm accounting problems. Special emphasis will be given to the problem of devising and executing an accounting system that will give necessary details on specific enterprises for analysis and control. 2 lectures, 1 2-hour laboratory. Prerequisite: Actg 131, 132

Farm Management/Finance

FM 461, 462 Senior Project (2) (2)

Analysis of a farm management problem selected by student with approval of adviser. Project results are presented in a formal report. Minimum 120 hours total time.

FM 463 Undergraduate Seminar (2)

Student presentation and description of developments and problems in farm management. 2 lectures.

FM 520 World Agricultural Development (3)

Special problems of agricultural development in selected emerging nations; considering the role of government policies in directing development. 3 lectures. Prerequisite: FM 307

FM 581 Graduate Seminar in Farm Management (3)

Group study of current problems; development and analysis methods in the field. Consideration given to the place of Farm Management in the teaching of vocational agriculture. 3 lectures.

FINANCE AND PROPERTY MANAGEMENT

FPM 310 Insurance Principles (3)

Basic principles of insurance from the viewpoint of the consumer. Risk and risk bearing; principles of insurance buying; major types of private insurance—life, property, liability—and the underlying economic problems each type is designed to meet. The insurance contract and its legal basis. 3 lectures. Prerequisite: Bus 301 or 307 or consent of instructor.

FPM 311 Property and Casualty Insurance (3)

Analysis of insurance investments, policies, forms, endorsements, and rate making. Fidelity and surety bonding; analysis of policies and rate making. 3 lectures. Prerequisite: FPM 310

FPM 312 Life and Health Insurance (3)

Analysis of contracts from the viewpoint of the insurance consumer, interpretation of major policy provisions, integration of private policies with social insurance coverages. 3 lectures. Prerequisite: FPM 310

FPM 330 Real Estate Principles (3)

Introduction to the field of real estate. Basic background for further study. Includes legal aspects, financing, valuation, public control, escrow and closing. 3 lectures. Prerequisite: Bus 301 or 307 or consent of instructor.

FPM 331 Real Estate Practice (3)

Practical aspects of the real estate business: licensing, office management, selling, contracts and leases, advertising and public relations, financing, escrow, taxation, insurance, business opportunities, property management and exchanging. 3 lectures. Prerequisite: FPM 330 or consent of instructor.

FPM 332 Real Estate Finance (3)

Trends, techniques and instruments in financing real property, including private and institutional sources of funds. Role of governmental agencies in real estate finance. 3 lectures. Prerequisite: FPM 330 or consent of instructor.

FPM 333 Real Estate Appraisal (3)

Cost, market and income approaches to valuation. Appraisal process applicable to urban, single and multiple family dwellings. 3 lectures. Prerequisite: FPM 330 or consent of instructor.

FPM 342, 343 Financial Management (3) (3)

Problems of financing current and fixed assets from internal and external sources. Emphasis on analysis, planning and control. 3 lectures. Prerequisite: Actg 223

FPM 411 Investments (4)

Survey of risk, media and objectives related to investment policies of individuals and institutions. Techniques of analysis, valuation and selection of securities. 3 lectures, 1 two-hour laboratory. Prerequisite: FPM 343 or consent of instructor.

FPM 412 Law of Real Property (3)

Legal theory and practice of estates in land. Landlord and tenant relationships, land transactions, mortgages and trust deeds, easements, land use, ownership rights in land and public land law. 3 lectures. Prerequisite: Bus 301 or 307

FOOD INDUSTRIES

FI 101 Survey of Food Industry (2)

Introductory course including size, distribution, major production areas of the food processing industry. 2 lectures.

FI 104, 105 Applied Food Processing (3-6) (3-6)

Application of principles and practices of food processing in industrial situations. One unit of credit for each month of employment in an approved industrial work assignment. Written reports required as determined by the instructor. Prerequisite: Completion of two quarters' curriculum requirements with minimum of C grade average. Limited to technical program students.

FI 122 Food Processing Machinery (3)

Physical properties of water and steam and their usage. Introduction to unit operations such as washing, peeling and cutting. 2 lectures, 1 laboratory.

FI 123 Elements of Food Preservation (3)

Principles of food preservation including canning, freezing, dehydration and fermentation. 2 lectures, 1 laboratory.

FI 200 Special Problems for Undergraduates (1-2)

Individual investigation, research studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

FI 210 Meats (3)

Practice in slaughtering and processing of beef cattle, sheep and hogs. A study of carcass grades, yield, and cut out value. Meat curing methods, by-products and consumption trends. 2 lectures, 1 laboratory.

FI 212 Meat Classification and Grading (2)

A comprehensive and detailed study of those factors related to carcass quality, conformation, and finish, to include meat classification, grading and judging of carcass and wholesale cuts of beef, pork, and lamb. Field trip to meat packing plants is required. 1 lecture, 1 laboratory. Prerequisite: FI 210

FI 221, 222, 223, 224 Food Processing Operations (3) (3) (3) (3)

Lecture and laboratory study of complete processing procedures for seasonal fruits and vegetables, specialties and other processed food. 2 lectures, 1 laboratory. FI 224 offered in summer only. Prerequisite: FI 123 or 230

FI 230 Elements of Food Processing (4)

Principles of unit operations in food processing covering canning, freezing, dehydration, concentration and fermentation. Food quality and spoilage. For majors other than Food Processing majors. 3 lectures, 1 laboratory.

FI 233 Processed Food Inspection (3)

Fundamentals, principles and procedures for inspecting processed foods based upon federal and state grades. Laboratory work in grading various products. 2 lectures, 1 laboratory.

Food Industries

FI 309 Meat Procurement and Use (3)

Selection, identification and cutting of meat. Physical and chemical composition of meat and its relationship to flavor, tenderness, and nutritional value. 2 lectures, 1 laboratory. Prerequisite: HE 210 or Chem 328

FI 321 Food Plant Quality Control (3)

Methods of organizing and operating food and plant quality control systems including chemical and physical techniques. 2 lectures, 1 laboratory. Prerequisite: FI 221 or 233

FI 331 Sanitation and Waste Disposal (3)

The organization, management and operation of a food plant sanitation and waste disposal program. 2 lectures, 1 laboratory. Prerequisite: Chem 226, Bact 221

FI 332 Statistical Quality Control (3)

The application of statistical methods in quality control programs and evaluation of operations. 2 lectures, 1 laboratory. Prerequisite: FI 221, 222, or 223

FI 336 Packaging (4)

Study of packaging materials, packages and packaging methods applicable to a variety of processed foods. 3 lectures, 1 laboratory.

FI 338 Sausage, Smoked and Canned Meats (3)

The manufacturing of processed meats. Product formulation, curing, smoke house operation, meat canning, sanitation and quality control. 2 lectures, 1 laboratory. Prerequisite: FI 309, 210 or 212

FI 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

FI 421, 422 Advanced Food Processing (3) (3)

Detailed study of more involved processing operations and the physical and chemical actions of the processes. Basic properties of carbohydrates, proteins and lipids in relation to products and processes. 2 lectures, 1 laboratory.

FI 425 Food Evaluation (3)

Characteristics of food color, consistency, texture and flavor. Sensory evaluation and grading. Food acceptance testing. Statistical analysis of data. 2 lectures, 1 laboratory.

FI 431 Meat Technology (3)

Characteristics of meat and meat products as related to processing and marketing with special emphasis on problems and variations encountered during these operations. 2 lectures, 1 laboratory. Prerequisite: Junior standing and permission of instructor.

FI 433 Food Production Control (4)

Plant equipment construction, plant layout and flow lines, cost estimating, work simplification, automation and control systems. 3 lectures, 1 laboratory. Prerequisite: Junior standing and instructor's permission.

FI 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

FI 463 Undergraduate Seminar (2)

Major developments in the chosen field of the student. Discussion of new developments, policies, practices, and procedures. Each individual is responsible for the development and presentation of a topic in his chosen field. 2 lectures.

FI 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

FI 551 Food Constituents and Characteristics (4)

Graduate level study of chemical and physical properties of proteins, carbohydrates, lipids, pigments, enzymes and additives related to formulation and processing of food. 3 lectures, 1 laboratory. Prerequisite: Graduate standing and permission of instructor.

FI 581 Graduate Seminar in Food Processing (3)

Current findings and research problems in the field and their application to the industry. 3 lectures.

FRENCH**Fr 101, 102, 103 Elementary French (4) (4) (4)**

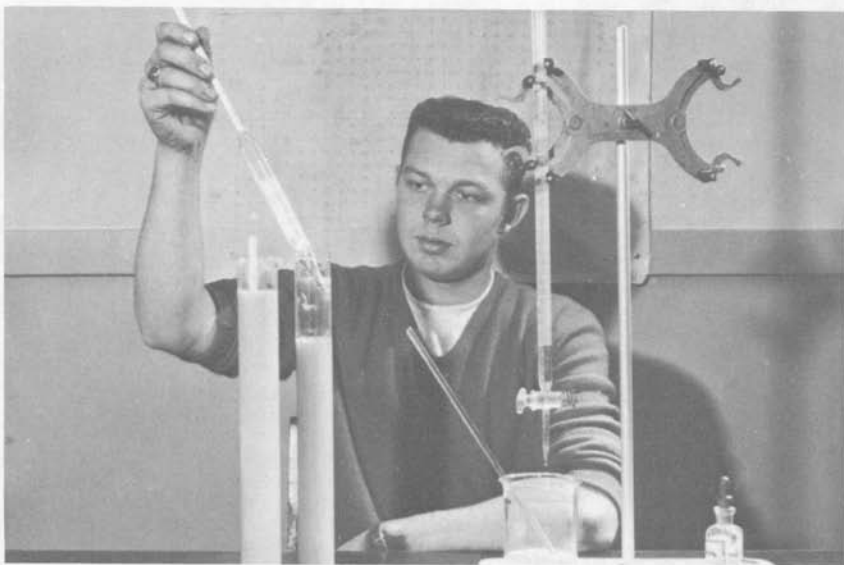
For beginners. Class practice in pronunciation, sentence structure, reading, writing, and basic conversation. Laboratory drill with recorded materials. 3 lectures, 1 two-hour laboratory.

Fr 201, 202, 203 Intermediate French (3) (3) (3)

Further practice in speaking, reading, and writing French. Introduction to French culture. 3 lectures. Prerequisite: Fr 103 or equivalent.

Fr 301, 302, 303 Third Year French (3) (3) (3)

Readings in French literature; poetry, essays, novels, plays. 3 lectures. Prerequisite: Fr 203 or equivalent.

**FRUIT SCIENCE****FrSc 123 Beekeeping (3)**

Practical studies and exercises in the handling of honey bees with special reference to pollination of commercial crops. Honey processing and marketing. Bee inspection and disease detection. 2 lectures, 1 laboratory.

FrSc 131 Pomology (4)

History and outlook for California fruit growing. Apple, peach, pear and prune production practices. Field laboratories in orchard management practices, tree and fruit identification, harvesting, grading and packaging of college orchard products. 3 lectures, 1 laboratory. Credit will not be allowed for both FrSc 131 and 230.

Fruit Science

FrSc 132 Pomology (4)

Planting and planning the deciduous orchard. Apricot, cherry, fig, olive and plum production practices with special emphasis on pruning trees and grapevines. 3 lectures, 1 laboratory. Prerequisite: FrSc 131

FrSc 133 Pomology (4)

Production practices common to deciduous nut crops produced in California. Normal spring cultural problems including thinning and spraying. Small fruit culture. 3 lectures, 1 laboratory. Prerequisite: FrSc 132

FrSc 230 California Fruit Growing (4)

Production practices, areas of production, suitable varieties, harvest and processing of important deciduous and subtropical fruit crops. Methods of propagation and training. 3 lectures, 1 laboratory. Credit will not be allowed for both FrSc 131 and FrSc 230

FrSc 231 Viticulture (4)

A comprehensive study of grape growing utilizing the college plantings for field practice in planting, training and maintaining the vineyard. Varietal identification and use. 3 lectures, 1 laboratory.

FrSc 232 Fruit Plant Propagation (4)

Propagation by seed, cuttings, layering, grafting, and budding. Rootstocks for deciduous fruits, commercial nursery practices. 3 lectures, 1 laboratory. Prerequisite: FrSc 133 or 230

FrSc 239 Home Fruit and Vegetable Production (3)

Growing, handling and evaluating fruits and vegetables common to demonstration and Estate plantings. Varietal characteristics and climatic adaptation. 2 lectures, 1 laboratory.

FrSc 324 Tropical Fruit and Nut Production (4)

Common practices in producing tree and fruit crops of economic importance in tropical areas—cocoa, tea, coffee, pineapple, oil palm, bananas, dates and papaya. 3 lectures, 1 laboratory.

FrSc 331 Advanced Viticulture (4)

Commercial production practices, mechanization and processing. Management of college planting. Field labor management efficiency studies. Techniques in handling and harvesting. 3 lectures, 1 laboratory. Prerequisite: FrSc 231

FrSc 332 Citrus and Avocado Fruit Production (4)

Growing and marketing oranges, lemons, grapefruit, avocados and dates. Minor subtropical fruits also included. Orchard practice. 3 lectures, 1 laboratory.

FrSc 421 Advanced Pomology (3)

Storage problems, post-harvest physiology, environmental factors affecting fruit development. Maturity standards. Two-day field trip required. 2 lectures, 1 laboratory. Prerequisite: FrSc 131 or 230

FrSc 436 Orchard Management (4)

Organization and management of labor and equipment in field and processing operations. Production problem analysis. Advanced work in production management. Job instruction training. 3 lectures, 1 laboratory. Prerequisite: FrSc 421

FrSc 521 Advanced Fruit and Nut Crop Production (4)

Advanced commercial production and management techniques. Use of mechanical aids and harvesters as related to size of crops, harvesting, and post-harvest handling. 3 lectures, 1 laboratory. Prerequisite: Permission of instructor.

FrSc 581 Graduate Seminar in Fruit Production (3)

Group study of current problems of fruit production; current experimental and research findings as applied to production and marketing. 3 lectures.

GEOGRAPHY

Geog 201 Regional World Geography (3)

Regional geographical characteristics and interrelationships emphasizing the international importance, problems, and potentialities of Europe and the Soviet Union. Primarily for the elementary or the secondary school teacher. 3 lectures.

Geog 202 Regional World Geography (3)

Regional geographical characteristics and interrelationships emphasizing the international importance, problems, and potentialities of the Middle East, Africa, and the Orient. Primarily for the elementary or secondary school teacher. 3 lectures.

Geog 203 Regional World Geography (3)

Regional geographical characteristics and interrelationships emphasizing the international importance, problems, and potentialities of the Pacific World, Latin America, the United States, and Canada. Primarily for the elementary or the secondary school teacher. 3 lectures.

Geog 308 Global Geography (3)

Survey of man's utilization and occupation of the earth. Interrelations of human life and elements of natural dependence of nations, and world trade. Supporting power of geographical environment. 3 lectures.

Geog 315 Political and Economic Geography (3)

Survey of world resources, mineral and agricultural, and of the geographical factors affecting their production and distribution. An analysis of economic geographic factors in current international affairs. 3 lectures.

Geog 401 Area Geography (3)

Depth study of geographic characteristics of a selected world area. Each time the course is offered it will bear a subtitle descriptive of the particular world area studied. 3 lectures. May be repeated to a total of 12 units. Prerequisite: Geog 315

GEOLOGY

Geol 201 Physical Geology (3)

Processes responsible for the earth's present characteristics. Mountain building, metamorphism, igneous activity, depositional agencies, sedimentation. Examples from local area. Topographical and geological maps. Rocks and minerals. 3 lectures.

Geol 202 Historical Geology (3)

Role of sedimentary rocks in correlating past changes in the earth. Value of fossils as a means of dating rocks and illustrating changes in environment. Local geological and topographical maps relative to processes which shaped earth history. 3 lectures.

Geol 241 Physical Geology Laboratory (1)

Properties, identification, and origin of earth materials. Interpretation of topographic maps, aerial photos, geologic maps, scale models, and field observations in terms of the effect of geologic processes on the earth's surface, internal structure, and man's use of the earth. 1 laboratory. Prerequisite or concurrent: Geol 201

Geol 321 Marine Geology (4)

Techniques of ocean floor exploration, nearshore sedimentary processes and shoreline evolution, continental margin sediments and geologic history, ocean floor topography and sediments, origin and evolution of ocean basins, physical resources of the ocean. 3 lectures, 1 activity. Prerequisite: Geol 201 or consent of instructor.

GERMAN

Ger 101, 102, 103 Elementary German (4) (4) (4)

For beginners. Class practice in pronunciation, sentence structure, reading, writing and basic conversation. Laboratory drill with recorded materials. 3 lectures, 1 two-hour laboratory.

Ger 301, 302 Scientific German (4) (4)

Short, intensive grammar; emphasis on reading of scientific German periodicals and texts. Laboratory drill with recorded materials. 3 lectures, 1 two-hour laboratory.

GRAPHIC COMMUNICATIONS

GrC 101 Introduction to Graphic Communications (2)

Orientation to the program and objectives of the Graphic Communications Department. History and traditions of the printing industry. Analysis of technological change. Employment opportunities. 2 lectures.

GrC 102 Proofreading (2)

Copy editor's and proofreader's marks, spelling, punctuation, division of words, compounding, and style. Methodical approach to proofreading. 2 lectures.

GrC 104 Graphics (3)

Principles of design and display. Type classifications, copy preparation, copy fitting, schools of typography and the influence printing processes have on the selection of type. 3 lectures.

GrC 111 Printing Papers (2)

Analysis of the papermaking processes for coated and uncoated papers. Paper properties and terminology. Characterization of papers and other printing stocks. Paper testing. 2 lectures.

GrC 122 Typography (4)

Fundamentals of design with type. The point system, type identification, printing vocabulary, and copy markup systems. Introduction to cold type processes. 3 lectures, 1 laboratory. Prerequisite: GrC 104 or consent of instructor.

GrC 123 Binding and Finishing (3)

Planning of printing to be bound. Cutting, folding, assembling of folded material, binding of finished material in final form. Case and perfect bookbinding. 2 lectures, 1 laboratory.

GrC 126 Relief Plates (2)

Characteristics and making of photoengravings, electrotypes, plastic wrap-around plates, stereotypes, and rubber plates. 1 lecture, 1 activity.

GrC 127 Graphic Arts Processes (3)

Introduction to the graphic arts. Printing processes, design, layout, composition, presswork, cold type, binding, silk screen, offset, photography, and duplicating processes. For non-majors. 1 lecture, 2 laboratories.

GrC 132 Letterpress (3)

Operation and maintenance of platen and cylinder presses. Introduction to imposition, lock-up, makeready, registration, ink control. Analysis of rollers, ink and paper. 1 lecture, 2 laboratories.

GrC 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

GrC 201 Theory of Color (2)

Light and color theory. Understanding of the physical, chemical, and psychological concepts of color. Relationship of color to temperature. Color systems. Application of color theory to full-color printing. 2 lectures.

GrC 204 Introduction to Printing Management (2)

Structure of the industry, levels and management, foremanship, materials handling, inventory control, plant safety, and management of printing processes. 2 lectures.

GrC 223 Copy Preparation for Reproduction (3)

Preparation of line and tone copy for offset and gravure reproduction. Designing roughs and visuals and preparation of single and multi-color mechanicals for use in commercial and publication printing. 2 lectures, 1 laboratory.

GrC 224 Composing Machines (3)

Keyboard operation of linecasting machines using the touch system. Care and adjustment of machines for efficient production of quality type. 1 lecture, 2 activities. Prerequisite: GrC 122, or consent of instructor.

GrC 225 Composing Machines (3)

Newspaper, bookwork, magazine and commercial composition. Instruction and practice in the maintenance and repair of linecasting machines and composing room equipment. 1 lecture, 2 activities. Prerequisite: GrC 224



GrC 227 Process Camera (3)

Characteristics of photographic materials for the graphic arts. Theory and practice in the use of gallery and vertical process cameras for the production of line and halftone negatives. Densitometry. Sensitometry. Applications for special purpose screens. 1 lecture, 2 laboratories. Prerequisite: Sophomore standing or consent of instructor.

GrC 228 Stripping and Platemaking (3)

Planning for lithographic press plates. Ruling, scribing, opaquing, and retouching negatives. Preparation of supports for stripping. Layout and assembly of stripped flats. Selection, care, and making of pre-sensitized lithographic plates. Proofing techniques. 1 lecture, 2 activities. Prerequisite: GrC 227

GrC 229 Lithography (3)

Theory and practice in the use of single-color sheet-fed offset presses. Sheet feeders, printing units, inking units, dampening units and deliveries. Characteristics of papers and inks for offset lithography. 1 lecture, 2 laboratories. Prerequisite: GrC 228

Graphic Communications

GrC 233 Letterpress (3)

Characteristics and operation of automatic letterpresses. Techniques and procedures for ink mixing and color matching. Advanced study of makeready systems. Ink and paper relationships. 1 lecture, 2 laboratories. Prerequisite: GrC 132

GrC 238 Advanced Graphic Arts (3)

Advanced study and related applications of design, layout, composition, press work and bindery. For non-majors. 3 activities. Prerequisite: GrC 127

GrC 301 Automated Typesetting (3)

Theory and operation of automated typesetting devices. Various processes and component systems. Computerized typesetting. Photocomposition. 2 lectures, 1 activity. Typing proficiency required. Prerequisite: GrC 225

GrC 303 Estimating (3)

Estimating commercial printing produced by letterpress and offset processes. Use of catalogs and standard price lists. Analysis of material, labor, and machine cost factors. 3 lectures.

GrC 307 Purchasing for Printing (2)

Procurement procedures for printing equipment, raw materials, trade services. Trade customs and practices concerning quantity buying, discounts, leasing and insurance. Securing the service of industry consultants and specialists. 2 lectures.

GrC 312 Theory of Lithography (3)

The lithographic process in relation to pH and water controls. Surface plates to deep etch. Film emulsions, reducers and intensifiers. Paper tests and ink reactions. 3 lectures.

GrC 323 Pre-Separated Art for Camrea (3)

Manual preparation and separation of line and continuous tone images for multi-color reproduction. Preparation of complex full-color mechanical layouts. 1 lecture, 2 activities. Prerequisite: GrC 223

GrC 326 Printing Equipment Maintenance (3)

Maintenance practices and procedures for all types of printing plant equipment. Designing and administering maintenance systems for various types of plants. Inventory systems for repair parts. 1 lecture, 2 activities. Prerequisite: GrC 225

GrC 329 Reproduction Engineering (3)

Orientation to high-speed, short-run reproduction. Microfilming, blueprinting, xerography. Direct image masters. Programmed duplicators. Specialized finishing operations. Coordination of rapid printing in captive and specialty printing plants. 2 lectures, 1 activity. Prerequisite: GrC 229

GrC 332 Publication Systems (3)

Modern production systems used by newspaper and magazine publishers. Production procedures, with emphasis on organization of composition facilities. 2 lectures, 1 laboratory. Prerequisite: GrC 122

GrC 333 Plant Organization and Layout (3)

Printing plant design and layout based on production analysis, work flow patterns, and utilization of space. Organization of plant services. 2 lectures, 1 activity.

GrC 334 Commercial Typography (3)

Design and composition for commercial printing: Corporate stationery, business forms, annual reports, folders, book, and direct mail pieces. Analysis of process limitations. 1 lecture, 2 activities. Prerequisite: GrC 223

GrC 335 Commercial Illustration (3)

Preparation and evaluation of original art copy for commercial use. Laboratory problems in drawing, layout, lettering for single and multiple color runs. Study of various approaches to registration; uses of color and texture in art copy. 1 lecture, 2 activity periods.

GrC 336 Advanced Letterpress (3)

One and two revolution flat bed and rotary letterpresses. Two color presses. Specialty presses. Die-cutting, embossing, die-stamping, and foil printing. Three and four-color process printing. 1 lecture, 2 laboratories. Prerequisite: GrC 133

GrC 338 Survey of Lithography I (3)

Camera copy preparation for offset, gravure and letterpress. Basic line and half-tone photography. For non-majors only. 2 lectures, 1 laboratory. Prerequisite: GrC 104 or 127, or consent of instructor.

GrC 339 Survey of Lithography II (3)

Introduction to stripping methods. Preparation of paper and presensitized plates for offset printing. Offset presswork procedures. For non-majors only. 2 lectures, 1 laboratory. Prerequisite: GrC 104 or 127, or consent of instructor.

GrC 341 Tape Perforation (2)

Standard and multiface tape perforators, transmitting equipment, reperforating and composing machine keyboard operating units. Operation of Teletypesetter tape perforating units. 2 activities. Prerequisite: Bus 141 or demonstrated typing proficiency.

GrC 357 Screen Processes (3)

Screen process reproduction methods with applications to industry and communications. Includes paper, tusche, knife-cut and photographic stencils. Printing mediums, surfaces, and industrial applications such as printed circuits and packaging. 3 activities.

GrC 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

GrC 401 Printing Sales (2)

Sales management, salesmanship, printing trade customs, and promotion of printed products. Servicing printing accounts. 2 lectures. Prerequisite: Senior or advanced junior standing.

GrC 407 Photocomposition (3)

Non-metallic composition for display and text types. First, second and third generation phototypesetting machines. Computerized photocomposition systems. 2 lectures, 1 activity. Prerequisite: GrC 236

GrC 408 Newspaper Production Management (2)

Sequential analysis of newspaper production processes. Organization of the production function. Personnel and industrial problems peculiar to the industry. 2 lectures. Prerequisite: GrC 332

GrC 411 Estimating and Pricing (3)

Development of an estimating system. Establishment of unit costs and operational time requirements. Analysis of process limitations, time standards, production coordination, service, subcontracting, overhead and profit. 3 lectures. Prerequisite: GrC 303

GrC 416 Web Printing (3)

Theory and practice in the use of web presses for letterpress, offset, rotogravure, and flexographic printing. Applications for packaging, business forms, magazines, books, catalogs and advertising materials. 2 lectures, 1 laboratory. Prerequisite: GrC 229

GrC 421 Printing Management (3)

Principles and applications of printing production forecasting. Functions of printing production control including orders, planning, scheduling, and dispatching. Printing production records. 2 lectures, 1 activity. Prerequisite: GrC 204

Graphic Communications

GrC 422 Printing Management (3)

Establishment of inspection standards for the printing industry. The appropriateness of judgment and measurement inspection. Instruments for quality control in the printing industry. 2 lectures, 1 activity. Prerequisite: GrC 421

GrC 423 Printing Management (3)

Organization and coordination of sales production, pricing and administrative aspects of printing operations. Industrial relations relative to commercial printing and publishing. 3 lectures. Prerequisite: GrC 422

GrC 434 Color Separation (3)

Equipment, materials, and techniques for color separation photography. Three and four color separations from opaque and transparent copy. Introduction to retouching, dot etching and color etching. 1 lecture, 2 laboratories. Prerequisite: GrC 201, 227

GrC 435 Advanced Lithography (3)

Single and multi-color sheet-fed offset presses. Process color printing and precision control of inking and dampening. Practice in quality control. 1 lecture, 2 laboratories. Prerequisite: GrC 229

GrC 437 Package and Container Production (3)

Analysis of the packaging industry with emphasis on reproduction processes, inks, materials (paper, plastics, glass and metals) and finishing operations such as die cutting, waxing, gluing, laminating and sealing. Standards of quality and uniformity as well as troubleshooting. 2 lectures, 1 laboratory.

GrC 441 Applied Printing Technology (3)

Practice in production of offset and letterpress printing. Planning, typesetting, copy preparation, camera, preparation of press forms and plates, presswork, binding and finishing. 3 laboratories. Prerequisite: Senior or advanced junior standing.

GrC 459 Graphic Communication Developments (3)

Developments and trends in processes, methods, materials and equipment used in graphic communication. 3 activities. Prerequisite: Senior standing or consent of instructor.

GrC 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in formal report. Minimum 120 hours total time. Prerequisite: Senior standing.

GrC 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent developments in the industry and senior project material. Each student is required to conduct the seminar class, under supervision of instructor, at least twice during the quarter. 2 lectures. Prerequisite: Senior standing.

GrC 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

GrC 521 Curriculum and Methods in the Graphic Arts (3)

Objectives, content, organization, scope, and evaluation of the graphic arts curriculum in secondary schools. Teaching procedures and methods of student evaluation. 3 lectures. Prerequisite: Admission to teacher education program.

HISTORY

Hist 101, 102, 103 History of Civilization (3) (3) (3)

Development of civilization from earliest times to the present. Political, economic, social, intellectual, and religious contributions of the various peoples to contemporary life. 3 lectures.

Hist 112 History of California (3)

Development of California; early explorations, colonization; institutions, government, and economy from beginning to the present; development of culture, industry, agriculture, government, and population. 3 lectures.

Hist 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Hist 201, 202, 203 United States History (3) (3) (3)

A comprehensive survey of the development of the United States from the 15th century to the present. Hist 201 satisfies the general education requirement of Hist 304 for Social Science and History majors. 3 lectures. Prerequisite: Sophomore standing.

Hist 204 Growth of American Democracy (3)

The historic backgrounds of present-day economic, political, and social problems. Development of American institutions and ideals. Not open to students with credit in or enrolled in Hist 203. 3 lectures. Prerequisite: Pol Sc 201

Hist 205 The United States in World Affairs (3)

The origin, nature, and implementation of U. S. foreign policy since the Second World War. Domestic and international factors relating to U. S. objectives; discussion and analysis of major issues and problems of contemporary U. S. foreign policy. 3 lectures. Prerequisite: Pol Sc 201, History 203 or 204

Hist 301 European Historiography (3)

Critical studies in historical sources and methods, with examples from the publications of recognized historians in several fields of European history. 3 seminars. Prerequisite: Junior standing.

Hist 302 American Historiography (3)

Critical studies in historical sources and methods, with examples from the publications of recognized historians in American history. 3 seminars. Prerequisite: Junior standing.

Hist 307, 308, 309 Latin American History (3) (3) (3)

Imposition of Spanish and Portuguese institutions upon native American cultures; resultant colonial political and economic administrations and problems. Ideological and commercial conflicts causing the wars for independence; clashes during the national period of constitutionalism and dictatorships, vested interests and economic change. Significance of the Mexican and Cuban social revolutions. 3 lectures. Prerequisite: Junior standing.

Hist 311, 312, 313 British History (3) (3) (3)

History of Britain from pre-Roman times to the present. Emphasizes social, economic, political, and cultural history. 3 lectures.

Hist 314 The Middle East (3)

Islamic civilization, the Ottoman Empire, origins of Pan-Islamism, Arab, Turkish, Iranian nationalism, impact of World Wars I and II, and the background of contemporary problems. 3 lectures. Prerequisite: Junior standing.

History

Hist 331 Early Afro-American History (3)

Political and social history of Afro-Americans from the early 17th century to the end of the Reconstruction. Contributions to American cultural and political life. 3 lectures. Prerequisite: Junior standing.

Hist 332 Recent Afro-American History (3)

Political and social history of Afro-Americans from the end of Reconstruction to the present as background of contemporary developments. 3 lectures. Prerequisite: Junior standing and Hist 331

Hist 341 Mexican History (3)

Obtrusion of Spanish institutions into the Mexican civilizations and the subordination of Spanish influence to the dominant Mexican cultures. Diffusion and struggle for identity of the Mexican in North America, progress of his twentieth-century revolt for social equity. 3 lectures. Prerequisite: Junior standing.

Hist 351, 352, 353 Modern European History (3) (3) (3)

Growth of political institutions; development of national states; imperial rivalries; origins of World War I; peace settlements; totalitarianism; World War II; developments since 1945. 3 lectures. Prerequisite: Hist 101, 102, 103 or permission of the instructor.

Hist 381, 382 African History (3) (3)

Survey of African history from earliest times; ancient African civilizations, Moslem penetration, indigenous kingdoms, European colonialism, rise of African nationalism, development of independent Africa as illustrated by the history of selected countries. 3 lectures. Prerequisite: Junior standing.

Hist 400 Special Problems for Advanced Undergraduate (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

Hist 401 Early American History to 1763 (3)

Age of exploration; European powers in eastern North America; English settlements; development of the English colonies, with emphasis on Virginia and Massachusetts; proprietary interests; growth of internal control, and colonial conflicts. 3 lectures. Prerequisite: Junior standing and Hist 201 or consent of instructor.

Hist 402 American Revolution and the New Nation (3)

Background of the Anglo-American imperial problem; the War for Independence and internal democratic upheaval of the era; establishment of the new nation, origins of the Constitution, the party system, American foreign policy, the national economy. 3 lectures. Prerequisite: Junior standing and Hist 201 or consent of instructor.

Hist 403 Early Jacksonian Eras (3)

Growing nationalism and simultaneous development of sectional rivalries; emerging two-party system; the transportation revolution; early industrialization; and a changing social order. 3 lectures. Prerequisite: Junior standing and Hist 201 or equivalent.

Hist 404 Civil War and Reconstruction (3)

Interaction of political, social and economic forces with personalities and ideas in a period in which the political process failed to function. 3 lectures. Prerequisite: Junior standing and Hist 202 or equivalent.

Hist 405 Rise of Industrial America (3)

Social, political, and economic history during the latter part of the 19th century. Interaction between rising industrialism and traditional agrarian democracy. Relationship between the industrial system and the values of democratic institutions. 3 lectures. Prerequisite: Hist 202 or equivalent and junior standing.

Hist 411, 412, 413 History of East Asia (3) (3) (3)

Social, political, economic, and intellectual developments in Japan, China, Korea, and Southeast Asia from earliest times to the present. 3 lectures. Prerequisite: Junior standing.

Hist 419 History of Education (3)

Rise of the Western educational tradition; major ideas, institutions, personalities. From the world of the Greeks to that of the Twentieth Century. 3 lectures. Prerequisite: Hist 203 or 304

Hist 425, 426, 427 Russian History (3) (3) (3)

Political, economic, and social and cultural history of Russia from the earliest times to the present. 3 lectures. Prerequisite: Junior standing.

Hist 460 Senior Project (2)

Selection and completion of a project under faculty supervision. Results presented in a formal report. Minimum of 60 hours time. Prerequisite: Hist 301 or 302

**Hist 470 Selected Advanced Topics (1-3)**

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

Hist 511 Sources in History (3)

Methods of finding and adapting authoritative source materials in history to the elementary and secondary classroom. 3 lectures. Prerequisite: Graduate standing.

Hist 521 Curriculum and Methods in History (3)

Content, organization and scope of social studies curriculum in secondary schools, methods of teaching. Evaluation of procedures. 3 meetings. Prerequisite: Major or minor in History or Social Sciences, admission to teacher education program and Graduate standing.

Hist 590 Seminar in History (3)

Historical analysis of selected problems and topics. Each seminar will carry a subtitle descriptive of its content. 3 meetings. Maximum of 6 units may be earned. Prerequisite: Graduate standing.

HOME ECONOMICS

HE 101 Orientation to Home Economics (1)

Explanation of educational requirements and programs in home economics. Adjustment to personal problems of freshmen. Required for all home economics freshmen fall quarter. 1 lecture.

HE 121 Introduction to Foods (5)

Formation and illustration of basic concepts of the scientific principles in food preparation. Supporting factors necessary for successful meal preparation. 3 lectures, 2 two-hour laboratories.

HE 122 Design Analysis for Home Economists (2)

Directed laboratory experience in use of design principles in everyday situations of costume coordination, food presentation, home furnishings, and home planning. 2 two-hour laboratories.

HE 131 Clothing Construction (5)

Experimental studies in clothing construction as related to care, performance, fabric, and design. Application to consumer education. 5 two-hour laboratories.

HE 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

HE 203 Personal and Home Management (3)

Home management as it is affected by personal and family situations. Emphasis on role of values in management and the relationship of goals to values. For both men and women. 3 lectures. Prerequisite: Sophomore standing.

HE 210 Nutrition (3)

Nutritional needs throughout the life cycle. Chemical composition of foods and their utilization in the body. 3 lectures. Men and women of sophomore standing or over.

HE 226 Home Food Conservation (2)

Conservation techniques to obtain maximum control of food quality with most efficient use of time, energy, and economic resources. 1 lecture, 1 two-hour laboratory. Prerequisite: HE 121

HE 229 Food Selection and Preparation (3)

Food supply, availability, quality and cost; food legislation; buying practices. Economic, nutritional, and aesthetic considerations in meal management. 2 lectures, 1 activity. Open to men and women. Prerequisite: Non-Home Economics major or permission of instructor.

HE 231 Household Equipment (3)

Efficient selection, use and maintenance of common types of household equipment. Simple repairs and adjustments. 2 lectures, 1 two-hour laboratory. Prerequisite: Sophomore standing.

HE 237 Children's Clothing (3)

Design, construction, and selection of children's clothing. Emphasis upon the psychological, physiological, and developmental needs of various age levels. Comparative analysis of self-made and ready-to-wear clothing. 2 lectures, 1 laboratory. Prerequisite: HE 233 or consent of instructor.

HE 241 Pattern Construction Analysis (3)

Pattern design analyzed through the basic techniques of fitting and use of flat pattern. 1 lecture, 2 laboratories. Prerequisite: HE 131 or consent of instructor.

HE 242 Interior Design (3)

Analysis of elements of interior design including consumer and socio-economic aspects. Individual creative laboratory experience in problems related to living space. 2 lectures, 1 two-hour laboratory.

HE 310 Maternal and Child Nutrition (3)

Nutritional requirements from conception to adolescence; role of nutrition in normal development. 3 lectures. Prerequisite: HE 210

HE 321 Meal Management (3)

Planning, preparing, and serving family meals. Emphasis on nutritional, aesthetic, and economic aspects. 1 lecture, 2 two-hour laboratories. Prerequisite: HE 121, 210

HE 322 Textiles (3)

Physical and chemical characteristics of natural and synthetic fibers. Yarns, fabrics, and textile finishes. Application of theory to textile fabrics. Selection, use, and care. 2 lectures, 1 three-hour laboratory. Prerequisite: Chem 226

HE 323 Housing for Contemporaries (3)

Basic principles and functions of house selection, planning, and decoration as they relate to: expressions of personality, architectural design and setting, and socio-economic levels. 3 lectures. Prerequisite: HE 242, junior standing.

HE 326 Demonstration Techniques (2)

Development of effective means of communication by use of the demonstration technique, through presentations with evaluations. 1 lecture, 1 two-hour laboratory. Prerequisite: Sp 201, HE 231, junior standing.

HE 328 Advanced Nutrition (3)

Nutrient requirements of man; factors affecting requirements. Evaluation of nutritional status. Topics in nutrition research. 2 lectures, 1 two-hour laboratory. Prerequisite: HE 210, Chem 226, Zoo 131

HE 332 Advanced Interior Design (2)

Individual creative experiences in problems of interior design. 2 laboratories. Prerequisite: HE 242

HE 333 Costume Design and Construction (3)

Designing by flat pattern and French draping. Designing for the individual and the fabric. Advanced construction and fitting techniques. 1 lecture, 2 laboratories. Prerequisite: HE 131, 241, 322

HE 341 Dynamics of Clothing (3)

Socio-psychological, economic and aesthetic aspects of clothing as related to human behavior. 3 lectures. Prerequisite: Junior standing.

HE 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Senior standing or consent of instructor.

HE 409 Furniture Design (3)

Development of furniture styles and their environments from ancient times to the present. Adaptability of individual furniture types to contemporary interiors. 3 lectures.

HE 410 Community Nutrition (3)

Problems inherent in improvement of local, state, national and international community nutrition; role of nutritionist in public health, social welfare, agricultural extension, and school lunch program. 3 lectures. Prerequisite: HE 210

Home Economics

HE 411 Methods and Materials for Homemaking Education (4)

Development of a timely philosophy in consumer and homemaking education. Classroom management, procedures, curriculum development, teaching aids and evaluating techniques for teaching homemaking in junior and senior high schools, including federally reimbursed programs. Field trips required. 4 lectures. Prerequisite: Ed 312, 401, 403

HE 412 Home Economics Student Teaching Seminar (3)

Practices and problems of student teaching in Home Economics. Synthesizes professional study and experience to develop teaching competence. Taken concurrently with student teaching. 3 lectures.

HE 413 Adult Homemaking Education (2)

Curriculum materials, procedures, teaching aids and evaluative techniques for teaching adult consumer and homemaking education. 2 lectures. Prerequisite: HE 411

HE 415 Methods of Teaching Nutrition (3)

Objectives, organization of subject matter, practical application of methods and techniques for teaching patients, medical and dietetic interns, student nurses, and employees. 3 lectures. Prerequisite: Senior standing, Ed 312

HE 421 Meals for Special Occasions (2)

Cultural and aesthetic aspects of food. Distinctive foods as related to the cultural and economic studies of worldwide cuisine. 2 three-hour laboratories. Prerequisite: HE 121, 210, 321



HE 422 Advanced Textiles (3)

Advanced study of fiber structure and fabric properties as related to fabric performance. Laboratory testing of fibers and fabrics. 2 lectures, 1 three-hour laboratory. Prerequisite: HE 322

HE 424 Home Management (3)

Philosophy of home management and factors involved in management of human and natural resources in the home; emphasis on the family as a unique economic unit in the changing American economy. 3 lectures. Prerequisite: HE 203, senior standing.

HE 425 Quantity Cookery (3)

Economic principles and problems involved in planning and preparing food using institutional equipment to meet specific product standards for large groups. 1 lecture, 2 laboratories. Prerequisite: HE 328 or consent of instructor.

HE 426 Food Production Management (3)

Principles of successful organization and management with their application to the effective operation of food service. Administrative responsibilities of the food service manager. Advance reservation with instructor required. 3 lectures. Prerequisite: HE 425 or consent of instructor.

HE 427 Equipment and Layout (3)

Selection, maintenance and arrangement of equipment and furnishings for food service departments with emphasis on materials, construction and specifications. Designated field trips required. 2 lectures, 1 laboratory. Prerequisite: HE 426 or consent of instructor.

HE 429 Diet Therapy (3)

Modification of normal food intake and dietary patterns, with emphasis on dietary adjustments necessitated by certain disease processes and conditions. 3 lectures. Prerequisite: HE 328

HE 433 Historic Costume (3)

Costumes of the past as related to contemporary fashions. Individual historic design and contemporary illustration required. 3 lectures. Prerequisite: HE 241 or permission of the instructor.

HE 442 Tailoring (2)

Selection and construction of tailored garments as related to merchandising. 2 laboratories. Prerequisite: HE 241 or consent of instructor.

HE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision, the project to be related to a probable field of employment. Results of the study are presented in a formal report. Minimum of 120 hours to be used in making the study. Prerequisite: All freshman, sophomore, and junior home economics courses must be completed.

HE 463 Undergraduate Seminar (2)

Study and discussion of current developments in the field of home economics. 2 lectures. Prerequisite: Senior standing.

HE 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

HE 501 Management of Family Resources (3)

Principles, major problems and trends in the economics of the family. 3 lectures. Prerequisite: Graduate standing.

HE 523 Time Studies in Home Management (3)

Developing and selecting labor-saving methods and devices for the able-bodied and handicapped. Individual and group investigation. Survey of literature. Current trends and methods of research. 2 lectures, 1 two-hour laboratory. Prerequisite: Graduate standing.

HE 525 Experimental Studies in Textiles (4)

Review and reporting of pertinent studies in textile research. Testing of fabrics using equipment available. 3 lectures, 1 laboratory. Prerequisite: HE 422 and graduate standing.

Humanities/Industrial Engineering

HE 528 Experimental Studies in Foods (4)

Experimental approach to the study of chemical and physical properties of interaction components of selected foods; correlated emphasis on selection, application, and evaluation of pertinent literature. 3 lectures, 1 laboratory. Prerequisite: Graduate standing.

HE 532 Problems and Trends in Home Decoration (3)

Relating trends in the home furnishing and housing industries to economic and sociological needs of the family. 2 lectures, 1 two-hour laboratory. Prerequisite: Graduate standing.

HE 580 Graduate Seminar (1-3)

Topics based on current issues of concern in various areas of Home Economics chosen according to the needs of the students enrolled. 1, 2 or 3 lectures. Prerequisite: Graduate standing.

HE 582 Graduate Seminar in Nutrition (1)

Critical review of literature on selected topics in the field of nutrition. Topics changed each quarter. May be repeated to 3 units. Prerequisite: HE 210, 328, graduate standing.

HE 599 Thesis (3) (3) (3)

Individual research under the general supervision of the staff, leading to a graduate thesis of suitable quality. Prerequisite: Graduate standing.

HE 621 (A-Z) Workshop (Various titles as required) (1½)

Special workshops organized either on the initiative of the college or at the request of special groups. Normally offered during the summer. Credit granted at the rate of 1½ units per week.

HUMANITIES

Hum 402 Human Values in Engineering (3)

Humanistic and social sciences learning for the engineer. 3 lectures. Prerequisite: Hist 205, Ec 201, Eng 207 or equivalent.

INDUSTRIAL ENGINEERING

IE 101 Introduction to Industrial Engineering (3)

Historical development of the industrial economy and the profession of industrial engineering. Basic concepts and principles of industrial organization and management. The dynamics of the industrial enterprise and the functional activities associated with industrial engineering. 3 lectures.

IE 122 Engineering Methods (2)

Introduction and application of basic engineering tools and concepts useful in industrial engineering. Dimensional analysis, error analysis, elementary mathematical models, and empirical equations. Data collection, evaluation, and formulation of engineering reports. 1 lecture, 1 laboratory.

IE 123 Industrial Systems Analysis (3)

Basic techniques of systems analysis. Application to a selection of industrial systems including production control, inventory, forms control, and cost control. Modern data processing techniques in fact gathering for systems evaluation. 2 lectures, 1 laboratory. Prerequisite: IE 101

IE 141 Manufacturing Processes (1)

Principles, practices and theory of metal casting, sand and shell molding; precision investment casting; die casting; plastic forming and molding. Basic fundamentals and theory of pattern making and hot forming by forging methods. 1 laboratory.

IE 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

IE 201 Production Costs Estimating (3)

Estimating the costs of a finished product from design and marketing information. Product material costs, processing and assembly labor costs, investment costs, overhead costs for typical manufactured items. Compilation of segmented cost information into a final result for engineering, customer, or marketing purposes. 3 lectures. Prerequisite: Sophomore standing

IE 202 Motion and Time Study (3)

Principles, tools, and techniques for methods improvement and the setting of time standards. Motion and time study as used by management for planning and control. A study of methods for systems analysis. 3 lectures. For Non-IE Students. Prerequisite: Junior Standing.

IE 204 Industrial Safety (2)

History of industrial safety; fire prevention; personal protective equipment; health hazards; machinery safeguards; electrical hazards; plant inspection; accident insurance. 2 lectures.

IE 212 Principles of Data Analysis (3)

Definition of data bases and information systems. Types of data generated and needed in industry. Industrial engineer's view of data and analysis needed for production systems. 3 lectures. Prerequisite: Engr 251

IE 214 Production Control (2)

Production control in the industrial complex. Basic functions of routing, scheduling, dispatching, and expediting. Studies in forecasting, estimating, and inventory control using linear programming and critical path method techniques. 2 lectures. Prerequisite: Sophomore standing.

IE 223 Man-Machine Systems (3)

Basic use of flow charting in work analysis. Principles of motion economy, work simplification, micromotion analysis, work sampling, and synthetic data. Quantitative analysis of time studies, allowance and performance ratings. Integration of these tools in man-machine systems. 2 lectures, 1 laboratory. Prerequisite: IE 123

IE 231 Production and Process Planning (3)

Analysis and planning of the layout of industrial plants. Simplification and standardization in product design and cost analysis. Process and systems analysis including flow process layout, materials handling, and automation. Continuous (process) or intermittent (job lot) production laboratory projects. For non-IE students. 2 lectures, 1 laboratory. Prerequisite: Sophomore standing.

IE 232 Dimensional Metrology (2)

Fundamental theory of dimensional metrology including inspection tools, standards, techniques, and application for linear measurements in industry. Design and application of direct-measuring tools, optical, pneumatic and electronic comparators, gages, and optical flats. 1 lecture, 1 laboratory. Prerequisite: Sophomore standing, or consent of instructor.

IE 233 Elements of Numerical Control Machining (2)

Theory, principles, and concepts of numerical control of machine tools. Principles and application techniques of various control media. Orientation in concepts of continuous path and point-to-point systems. Part programming including control tape preparation for numerical control drilling. 1 lecture, 1 laboratory. Prerequisite: ET 153, MP 142

Industrial Engineering

IE 239 Industrial Costs and Controls (3)

Development and use of manufacturing costs in management control systems for production planning, cost analysis, and cost control. Concepts and techniques employed in relation to cost determination and control functions of the industrial engineer. 2 lectures, 1 laboratory. Prerequisite: IE 123 or Actg 132

IE 240 Additional Engineering Laboratory (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

IE 251, 252 Manufacturing Engineering Laboratory (3) (3)

Engineering studies encompassing theory, principles and application concepts of manufacturing engineering in industrial enterprises. Projects in manufacturing process areas include experimental and design studies in metal casting, metal forming and cutting, metrology, and finishing processes. 1 lecture, 2 laboratories. Prerequisite: IE 141, ET 151

IE 304 Operations Research (3)

Preliminary study of basic management science tools and techniques. Probability applications, sampling analysis, inventory models, and waiting lines. Application to common production control problems. 3 lectures. Prerequisite: Stat 321

IE 305 Operations Research (3)

Introductory study of game theory. Linear programming, dynamic programming, and schedule sequencing. Computer programming in solution of problems. 3 lectures. Prerequisite: IE 304

IE 309 Industrial Linear Systems (3)

The production and production control system as a linear system with feedback. Transform theory applied for solution. Man as a noisy system element. 3 lectures. Prerequisite: Math 242, Stat 321

IE 319 Human Factors I (3)

Areas covered by human factors. Understanding of man's psychological and physiological characteristics. Human reactions and capabilities related to specific tasks and systems. Design of machines, operations, and work environment to match human capacities and limitations. 3 lectures. Prerequisite: Psy 202 and Junior standing.

IE 336 Statistical Quality Control (3)

Statistical theory of sampling to analyze output variation. Managerial methods to control attributes of incoming or in-process material. Quantitative risk factors for decisions based on sampling procedures with associated operating characteristics and control charts. 3 lectures. Prerequisite: Stat 321

IE 343 Manufacturing Design (4)

Development of manufacturing data for process design and plant layout. Theory, principles, and techniques for research and product development involving detail design, prototype production, production drawings, process charts. Planning for the product, equipment, and facilities. 2 lectures, 2 laboratories. Prerequisite: IE 304

IE 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

IE 401 Sales Engineering (2)

Concepts and principles of engineering in sales. Role of the professional engineer in the analysis, design, development, production, and final application of a product or system required by the buyer. 2 lectures. Prerequisite: Senior standing in Engineering.

IE 403 Principles of Engineering Economy (3)

Development of methods to assess time value of money through mathematical models for evaluating economic factors in the making of individual or industrial decisions. For non-IE students. 3 lectures. Prerequisite: Senior standing

IE 404 Information Economics (3)

Cost of information, measures of information, man as a noisy information channel, inspection as an information process, sampling as a step in statistical inference, and the engineering decision process. 3 lectures. Prerequisite: Math 242, Stat 321

IE 406 Reliability Assurance (3)

Reliability mathematical models, mechanical device reliability, electrical device reliability, reliability data, assurance program elements. 3 lectures. Prerequisite: Math 242, Stat 321, CSc 219 or IE 304

IE 408, 409 Manufacturing System Optimization (3) (3)

Advanced linear programming, integer programming, dynamic programming, Monte Carlo simulation, resource allocation, queuing theory, applied to industrial problems. 3 lectures. Prerequisite: Math 242, Stat 321, CSc 219, IE 304

IE 411, 412 Organization for Manufacturing (2) (2)

Principles and techniques of administration and organization of the activities of an industrial enterprise. Planning, organization, staffing, direction and control functions in activities of: facilities, manufacturing processes, plant location, job evaluation and wage incentives, inventory control, production control, procurement, and sales. 2 lectures. Prerequisite: For non-IE students of Senior or advanced Junior standing or consent of instructor.

IE 413 Management for Engineers (2)

Principles of management involved in the administration of the organizational functions of an industrial enterprise. The principles will be concerned with the basic fundamentals of management, including development of management concepts and techniques involved in the various aspects of administrative action. For non-IE students. 2 lectures. Prerequisite: Senior standing in Engineering.

IE 414 Engineering Economy (3)

Categories of engineering decisions. Interest rates in the industrial complex. Basic principles and tools of analysis. Application to industrial engineering through the use of case studies. 3 lectures. Prerequisite: Senior standing.

IE 416 Value Engineering (3)

Analysis of design, material, and process to obtain desirable functional performance at minimum cost. Application to manufacturing products, systems, and services. 2 lectures, 1 activity. Prerequisite: IE 343 or consent of instructor.

IE 417 Advanced Systems Analysis (3)

Sequential decision processes, computer simulation, Monte Carlo techniques applied to production and production control problems. Cost effectiveness analysis. 3 lectures. Prerequisite: Math 242, Stat 321

IE 421 Manufacturing Organization (3)

Theory and principles of manufacturing organization systems and sub-systems. Analysis of the processes of production management. Use of systems approach to achieve unification of the production elements in terms of both analysis and synthesis, and interrelation between parts of the enterprise and the whole. 3 lectures. Prerequisite: IE 309, 343

IE 422 Manufacturing Management (3)

Integration of concepts of organization and management with sub-systems utilized in each segment of the manufacturing enterprise. 3 lectures. Prerequisite: Senior standing.

Industrial Engineering

IE 423 Public Problem Project Systems Engineering (3)

Exploration of the difficulties and possible solutions associated with a particular public problem selected by the class made up of non-engineers. Systems engineering and related methods are applied including the use of optimizing models based upon elementary algebra. 3 lectures. Prerequisite: Senior standing, non-engineer.

IE 424 Engineering Test Design and Analysis (3)

Methods for designing life tests and experiments. Interpretation of test results utilizing analysis of variance; single-factor, two-factor, three-factor and partial factorials; accelerated tests for trade-off between sample size and testing time; Weibull analysis including warranty data; sequential analysis and non-parametric tests. 3 lectures. Prerequisite: Stat 321, Senior standing or equivalent.

IE 425 Industrial Procurement (2)

Concepts and principles of engineering in procurement. Role of the professional engineer in screening, evaluation, and selection of products or systems in industry. 2 lectures. Prerequisite: Senior standing.

IE 429 Materials Handling (2)

Conceptual studies in effective movement of materials, including economic aspects of design of plant facilities. Transportation in-plant and to the consumer. 1 lecture, 1 laboratory. Prerequisite: Senior standing.

IE 434 Precise Mass and Flow Measurements (3)

Theory and techniques for precise measurement of mass, weight, density, acceleration, flow, and viscosity. 3 lectures. Prerequisite: ME 341

IE 437 Advanced Human Factors (3)

Principles, concepts, and theoretical models used in evaluating and maximizing human performance capacities. The design and analysis of experiments of evaluation and comparison, and the use of factorial experiments. 2 lectures, 1 laboratory. Prerequisite: IE 319 and Stat 321 or consent of instructor.

IE 438 Precise Heat and Pressure Measurements (3)

Theory and techniques for precise measurement of heat quantity, specific heat, heat conductivity and heat flow, calorimetry, sensors for temperature and pressure, recording devices, pyrometry, vapor pressure. 2 lectures, 1 laboratory. Prerequisite: ME 302, 341, EL 322, IE 235

IE 441, 442 Fundamentals of Supervision (2) (1)

Theory and principles of supervision. Application of fundamental concepts and techniques of supervision provided by assignment in manufacturing laboratories. 2 laboratories, 1 laboratory. Prerequisite: IE 233

IE 451 Advanced Industrial Engineering Laboratory (2)

Theory, concepts, and applications in manufacturing planning and research. Verification and/or validation of manufacturing processes theories. 2 laboratories. Prerequisite: IE 252

IE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours of total time.

IE 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments and/or subject matter pertinent to industrial engineering. 2 lectures. Prerequisite: Senior standing in IE.

IE 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

INDUSTRIAL RELATIONS

IR 118 Human Relations (3)

Selected concepts in human relations, their integration and application to managerial environment and functional fields of business administration. 3 lectures.

IR 211 The Labor Movement in the United States (3)

Labor movement theories, American trade-union development, union management, labor and economic political power, variations in labor movements. 3 lectures.

IR 214 Industrial Relations (3)

The industrial relations function and its relationships within the business and industrial environment. Employment, training, wage and salary, and labor relations. 3 lectures.

IR 315 Personnel Administration (3)

Organization and manpower planning, recruitment, selection and placement of employees. Employee education and development. Interviewing, testing, reference checking, performance appraisal, and development techniques. 3 lectures. Prerequisite: IR 214

IR 316 Labor Contract Administration (3)

Simulation techniques designed to prepare representatives of labor, management, and government agencies to resolve problems involving contracts between unions and companies. 3 lectures. Prerequisite: IR 211 or consent of instructor.

IR 319 Wage and Salary Administration (3)

Functions of management that involve planning, developing, directing, and controlling all phases of employee compensation. Areas included are: job evaluation, employee evaluation, job standardization and work measurement, incentive wages and managerial compensation. 3 lectures.

IR 410 Supplemental Employee Benefits (3)

Supplemental benefit programs for employees. Effect on payroll and other costs, contract negotiations, employee relations. Pensions, hospitalization, insurance, supplemental unemployment benefits, job security, vesting rights, bonuses, severance pay, profit sharing plans. 3 lectures. Prerequisite: IR 214

IR 412 Collective Bargaining (3)

Collective bargaining in the relationship between management and labor in a simulated situation. The bargaining unit, recognition, development of the labor agreement, and case studies of strikes, picketing, boycotts, unfair labor practices, mediation and arbitration. 3 lectures. Prerequisite: IR 316

IR 413 Labor Law (3)

Federal and state labor laws and their effects upon labor and management. 3 lectures. Prerequisite: Bus 301 or 307

IR 415 Business and Human Relations (3)

Individual and group practice emphasizing the aims of management training in the behavioral sciences to achieve greater individual job effectiveness, improve interpersonal relationships in the organization, and enhance individual adjustment to the context of his total environment. 3 lectures. Prerequisite: IR 118 and senior standing or consent of instructor.

INDUSTRIAL TECHNOLOGY

IT 101 Technical Computation (2)

A study of the techniques used in the analysis and solution of typical technical problems. Emphasis on the need for orderly work, checking procedures, handling and presenting scientific data; purpose and presentation of technical reports. 2 lectures.

IT 111 Introduction to Industrial Technology (2)

Orientation to the objectives of the Industrial Technology Department. Investigation of employment opportunities. Development of techniques useful to the student in his study. 2 lectures.

IT 125 Industrial Wood Processes (2)

Analysis of basic woodworking equipment, processes and materials currently used in lumbering, mill-cabinet, general construction and related industries. Theory and practice in the use of woodworking equipment. 1 lecture, 1 laboratory.

IT 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

IT 222 Power Technology: Sources (2)

Analysis of power sources: natural, steam, internal combustion, continuous combustion, nuclear energy, fuels and lubricants. 1 lecture, 1 activity. Prerequisite: Phys 123

IT 223 Power Technology: Transmission (2)

Transmission of power: clutches, gear trains, wrapped connectors, hydraulics, universal joints, bearings, lubricants. 1 lecture, 1 activity. Prerequisite: Phys 123

IT 233 Metal Technology (3)

Theory and practice in care and use of hand and machine tools. Applications of welding, forging, foundry, sheet metal, ornamental metal, machine shop and bench metal processes to the fabrication of industrial products. 3 activities. Prerequisite: MP 141, 142; WM 141, 142; MP 143; IE 141



IT 237 Industrial Electricity (5)

Theory and application of basic A-C and D-C circuits. Magnetic circuits. Principles of motors and generators, instruments, control and control circuits, transformers and circuitry, oscilloscopes. 4 lectures, 1 laboratory.

IT 241 Introduction to Manufacturing Technology (2)

Current and new basic industrial materials, processes and applications. Manufacturing in electronics, metals and machine tools, mass production processes, graphic arts, power technology, plastics, wood technology, innovations in drafting. Primarily for non-Industrial Technology majors. 2 activities.

IT 245 Technical Sketching (2)

Freehand sketching of industrial products using perspective, isometric oblique and orthographic projection. Shading. Basic design. 2 activities. Prerequisite: ET 151

IT 304 Product Quality Control (3)

Applications at the supervisory level of the overall quality plan for manufacturing. Quality assurance, testing, shop and field inspection techniques, material review, source inspection, vendor surveillance, and quality audit. 3 lectures.

IT 324 Modern Industrial Finishes (2)

Characteristics and applications of finishes to modern industrial products. Brushing, dipping, spraying, baking, plating, etching. 2 laboratories.

IT 326 Product Evaluation (2)

Procedures in the gathering, preliminary analysis and practical application of quality and reliability field data by industrial sales and service personnel. Principles of value engineering and production quality control techniques in relation to customer needs. 2 activities. Prerequisite: Junior standing.

IT 327 Plastics Technology (2)

Technical processes, materials, tools and equipment used in plastics manufacturing. Foam, expandable bead and liquid casting, injection molding, thermo-forming, dip-coating, laminating and plastic welding processes. Basic operations in plastic pattern-making, cutting, fabricating, and finishing. 1 lecture, 1 laboratory. Prerequisite: IT 125, MP 141, 142, Chem 122

IT 330 Principles and Practices of Industrial Arts (5)

Techniques and procedures for teaching industrial arts; observations in neighboring schools; survey of methods applicable to teaching drafting, crafts, wood, metal, electricity-electronics, graphic arts, power mechanics and general shop; shop organization; evaluation; preparation for practice teaching. 5 activities. Prerequisite: Junior standing.

IT 331 Industrial Electrical Systems (4)

Industrial applications of electrical concepts in distribution systems, industrial wiring, illumination, motors and controllers. 3 lectures, 1 laboratory. Prerequisite: IT 237, Math 131

IT 332 Electronic Control Systems (4)

Automated control devices from an operational and servicing viewpoint. Modular approach to the study of electronic control systems. 3 lectures, 1 laboratory. Prerequisite: Phys 122, IT 237

IT 333 Electronic Computer Applications (3)

Fundamentals of analog computers, electronic data processing machines, and numerical control of machine tools. Applications in production supervision, sales, and industrial education. 2 lectures, 1 laboratory. Prerequisite: IT 237, or consent of instructor.

IT 336 Automotive Technology, Engines (3)

Engine overhaul and maintenance, theory and construction. Practical activities with various types of engines, including automotive, marine, and low horsepower power plants. 1 lecture, 2 laboratories. Prerequisite: IT 222

Industrial Technology

IT 339 Automotive Technology, Fuel Systems (2)

Fuel systems and fuels used in internal combustion engines. Carburetors, injectors, superchargers, manifolds, pumps, and storage tanks. Types of fuels and their compounding. 1 lecture, 1 laboratory. Prerequisite: IT 222

IT 343 General Metals (2)

Applications of the various metal fabrication processes to typical construction problems. Design and construction of instructional aids suitable for the secondary school industrial arts program. 2 laboratories. Prerequisite: IT 233

IT 344 Technical Drawing (2)

Application of current drafting procedures in preparing complete graphic descriptions of industrial components. Sketching, lettering, instrument drawing, reproduction processes. Preparation of work drawings and specifications. Analysis of drafting materials, equipment and processes. 2 activities. Prerequisite: IT 245

IT 346 Industrial Design (2)

Applications of design principles to the various materials and processes of industry; development of a creative, problem-solving approach to design as it applies to industry. 2 activities. Prerequisite: IT 245

IT 350 Quality Systems Applications (3)

Philosophy and principles of quality system administration. Relationship to total systems program administration; impact on management information and data requirements. Quality system administration techniques applied to control performance, cost and schedule data, traceability, and retrievability. 3 lectures. Prerequisite: Stat 212, Junior standing.

IT 352 Additional Laboratory Problems (1-2)

Advanced instruction in the construction, repair, maintenance and use of laboratory equipment. Primarily for students intending to become industrial education teachers. Total credit limited to 4 units with not more than 2 units any one quarter. 1 or 2 laboratories. Prerequisite: Consent of instructor.

IT 353, 354, 355 Wood Technology (3) (3) (3)

Application of design principles, materials and construction techniques to mill cabinetwork, furniture manufacturing, and machine tool maintenance. Materials and methods used in modern industry. 3 activities. Prerequisite: IT 125

IT 356 Building Construction Techniques (3)

Examination of modern materials and construction methods as applied to home building; mass-production, custom-building and prefabrication. Field study of representative projects; laboratory experience in framing and basic processes. 3 laboratories. Prerequisite: IT 353

IT 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

IT 404 Customer Relations (2)

Customer contacts: personal relationships, ethics, legal relationships, service contracts, communication channels. 2 lectures. Prerequisite: Mktg 204. Senior standing or consent of instructor.

IT 405 Industrial Marketing (2)

Investigation of the institutions and channels involved in industrial marketing. Analysis of industrial products, competitors, and consumers. Problems in marketing research, personnel, and management. Individual reports on industrial products, companies or training programs. 2 lectures. Prerequisite: Mktg 204. Senior standing or consent of instructor.

IT 406 Cost Reduction and Control (3)

Application of cost control procedures at the foreman level. Techniques of cost reduction. Goals in reducing waste of material and defects in workmanship. 3 lectures. Prerequisite: Senior standing, IE 231

IT 407 Industrial Product Development (3)

Organization for new industrial product development, linking marketing, operations and technology functions; sources and screening of new product ideas, sizing and evaluation of market prospects, budgeting, pricing, timing, advertising and distribution factors as they relate to new industrial products, internal coordination during product development phases. 3 lectures. Prerequisite: IT 404, 405

IT 415 Industrial Equipment Selection (3)

Electrical and mechanical equipment making up the utility and production support systems of a modern industrial plant. Technical alternatives available in terms of economic choice for project profitability, capital budgeting in terms of industrial equipment planning. Forecasting of depreciation due to unusual wear, use, and technological obsolescence. 3 lectures. Prerequisite: IT 331, 432, Ec 212

IT 418 Technical Management Problems (4)

Organization and positions of key personnel in corporate technical management structure; their functions, duties and interfaces with operations, marketing, general management and research/development. Structure and objectives related specifications and proposals with case studies. 3 lectures, 1 activity. Prerequisite: Senior standing, Mgt 311

IT 422, 423 Construction Equipment (2) (2)

Analysis of major types of construction equipment from a practical marketing viewpoint. Contract specifications, estimating, basic processes utilizing construction equipment, selection of appropriate equipment and equipment operation and maintenance. 1 lecture, 1 laboratory. Prerequisite: IT 222, 223, 237

IT 426 Automotive Technology, Chassis (3)

Fundamental, technical, and teaching aspects of automotive suspension systems, steering, braking, and other control systems. Tires and lubrication. 3 activities. Prerequisite: IT 223

IT 427 Automotive Technology, Electronics (3)

Applications of electronic and electrical systems in automotive type equipment including ignition, lighting, starting, charging, auxiliary systems, and control systems. 2 lectures, 1 laboratory. Prerequisite: IT 222, 223

IT 428 Automotive Technology, Power Trains (3)

Advanced applications of clutches, gears, hydraulics, pneumatics, and wrapped connectors. Universal joints, bearings, and lubricants in automotive type equipment. 1 lecture, 2 laboratories. Prerequisite: IT 223

IT 429 Modern Industrial Materials (2)

An investigation of the characteristics, applications and limitations of materials of industry including: plastics, glass, ceramics, rubber, leather, textiles, abrasives and adhesives. 1 lecture, 1 laboratory. Prerequisite: Senior standing.

IT 431, 432 Mechanical Systems (3) (3)

Applications of basic physics to mechanical systems using the English system of units; various component systems. Steam systems, air conditioning and refrigeration systems, pneumatic and hydraulic systems, piping systems. 2 lectures, 1 activity. Prerequisite: Math 131, Phys 122, IT 223

IT 433 Mechanical Systems (3)

Case study of industrial manufacturing processes from an operational and service engineering viewpoint. Materials handling techniques. Production equipment and systems. 2 lectures, 1 activity. Prerequisite: Junior standing.

Industrial Technology

IT 438 Advanced Plastics (3)

Properties and characteristics of thermosetting and thermoplastic materials. Analysis and construction of molds and dies for use with reinforced plastics, injection molding, thermoforming processes; extrusion, and compression and transfer molding. Selection of plastics. 1 lecture, 2 activities. Prerequisite: IT 327

IT 441 Metal Production Processes (2)

Study of mass-production techniques; design, production planning, tolerances, jigs and fixtures, interchangeable parts, assembly line. Design and construction of projects suitable for industrial arts metal courses. 2 laboratories. Prerequisite: IT 343, 433, Phys 123

IT 446 Wood Production Processes (2)

Study of mass-production techniques; design, production planning, jigs and fixtures, interchangeable parts, assembly line. Design and construction of projects suitable for industrial arts wood courses. 2 laboratories. Prerequisite: IT 353, 433

IT 451 Electronics: Industrial Education (4)

Teaching applications of the principles and operation of non-linear devices such as vacuum tubes, semi-conductors and associated solid state components. Programs and experiments for the teaching of electronics at the secondary level. 3 lectures, 1 laboratory.

IT 452 Electronics: Industrial Education (5)

Construction, testing, trouble-shooting and repair of electrical and electronic equipment; appliances, radios, amplifiers and television. Use of typical high school electricity-electronics equipment and analysis of procedures. 3 lectures, 2 laboratories. Prerequisite: IT 451 or approval of instructor

IT 453 Electronics: Industrial Education (3)

Planning, equipping and organizing a high school electricity-electronics industrial arts program. Course objectives and methods of teaching electricity and electronics at the high school level. Field trips to local high schools will be arranged. FCC regulations. 3 lectures. Prerequisite: IT 452

IT 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects results are presented in a formal report. Minimum 120 hours total time.

IT 463 Undergraduate Seminar (2)

Preparation, oral presentation and discussion by students of papers on related professional topics. 2 lectures.

IT 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

IT 521 Curriculum in Industrial Education (3)

Basic principles and practices in the preparation of course guides, courses of instruction and related materials for industrial instruction. 3 lectures. Prerequisite: Student teaching or teaching experience in public schools or industry.

IT 522 Facility Planning in Industrial Education (2)

Analysis of major factors in planning and designing industrial education laboratories and related areas. Includes State standards, equipment specifications, and presentation displays. 2 activities. Prerequisite: Student teaching or instructor approval.

IT 580 Graduate Seminar in Industrial Education (3)

Advanced study and analysis of selected topics and problems in industrial education. 3 meetings. Prerequisite: IT 463 or instructor's approval.

JOURNALISM

Jour 118 Introduction to Journalism (2)

Explores career opportunities in journalism, examines specialized communications problems, introduces organizations and methods of campus communication media offering opportunities for applied training, familiarizes student with campus community. 2 lectures.

Jour 201 Journalism History (3)

Survey of historical and current influences in the development of today's journalism media. 3 lectures.

Jour 202 News Writing (3)

Study of principles used in the reporting of news events for the press. Study and practice in writing various types of news stories, including interviews and speeches. Ethical and legal problems in gathering and reporting news. Some attention to news features. 3 lectures. Prerequisite: Typing proficiency and Eng 106

Jour 203 Reporting I (3)

Daily coverage of actual news events related to the campus community with emphasis on in-depth and investigative reporting. Special techniques and problems of reporting further explored with some off-campus assignments. 1 lecture, 2 two-hour laboratories. Prerequisite: Typing proficiency and Jour 202

Jour 214 Introduction to Broadcasting (3)

History of American broadcast media. FCC licensing and control, advertising practices, and trends in programming. Production of special types of programs. 3 lectures.

Jour 221 Basic Photography (3)

For those who have had limited experience in photography. Picture-taking techniques and darkroom practices. 2 lectures, 1 laboratory.

Jour 222 Advanced Photography (3)

Advanced techniques in camera and film use, print control, lighting and composition. Techniques in exposure and developing of color slides, color negatives and color printing. 2 lectures, 1 laboratory. Prerequisite: Jour 221



Journalism

Jour 223 Photojournalism (3)

Advanced techniques in developing photographic story and essay for newspapers and magazines. Fundamentals in advertising, fashion, and industrial photography. 2 lectures, 1 laboratory. Prerequisite: Jour 222 or consent of instructor.

Jour 233 Editing and Copy Desk (3)

Copy desk work, head writing, page makeup, special rewrite and editing problems, handling of correspondents, etc. 1 lecture, 2 two-hour laboratories. Prerequisite: Jour 202

Jour 251 Journalism Practice—Reporting and Editing (2)

Credit arranged for students holding editorial or other positions on college publications or securing other similar supervised experience. 2 laboratories. Prerequisite: Journalism major or instructor's permission. Total credit limited to 8 units.

Jour 254 Photo Practice (2)

Credit for students holding editorial or other positions on college publications or securing other similar supervised experience. 2 laboratories. Prerequisite: Jour 222 or permission of instructor. Total credit limited to 8 units.

Jour 302 Feature Writing (3)

Feature writing techniques. Study of markets for nonfiction articles; practice in gathering material and preparation of articles for technical and trade journals, and other media. 3 lectures. Prerequisite: Consent of instructor.

Jour 303 Illustrated Features (3)

Emphasis on market research and preparation of illustrated articles for publication. Close attention to techniques of combining photographs and text in article preparation and marketing. 3 lectures. Prerequisite: Jour 302

Jour 304 Reporting II (3)

Additional experience on advanced level in campus community news coverage with special attention to public affairs reporting. Special assignment for off-campus news media. 1 lecture, 2 two-hour laboratories. Prerequisite: Jour 203

Jour 333 Broadcast Media News I (3)

Radio and television news programming, fundamentals of writing and editing for radio and television. Community interviews. Copy preparation. Commercial tie-ins. 1 lecture, 1 laboratory, and assigned field work. Prerequisite: Sp 201

Jour 334 Advanced Copy Editing (3)

Daily experience and responsibilities in editing and rewriting news and feature stories, and editorial writing for campus news media. Practical application of headline writing and page makeup principles. 1 lecture, 2 two-hour laboratories. Prerequisite: Jour 202, 233

Jour 341 Broadcast Media Practice (2)

Credit arranged for students holding positions on college radio or closed circuit television news operations or other similar supervised experience. 2 laboratories. Total credit limited to 8 units. Prerequisite: Journalism major or permission of instructor.

Jour 351 Journalism Practice—Advertising (2)

Credit arranged for students holding advertising or other positions on college publications or securing other similar supervised experience. 2 laboratories. Total credit limited to 6 units.

Jour 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Jour 401 International Press (3)

Global communications facilities and operations; world transmission of information; survey of world wire services and international print and broadcast news media. Analysis of press operations under varying government ideologies. 3 lectures. Prerequisite: Pol Sc 201, Hist 204, Hist 205, Geog 308, or consent of instructor.

Jour 402 Press Laws (3)

State and federal laws affecting all communications media, hazards of libel and what defenses are recognized; contempt of court, right of privacy; study of postal regulations, regulations in advertising, broadcasting, photography, and business regulatory statutes; ethics and responsibility of the press and broadcast media. 3 lectures.

Jour 403 Newspaper and Magazine Management (3)

Management problems and procedures of newspapers and magazines including case studies in advertising, business, circulation, editorial, and production operations. 3 lectures. Prerequisite: Jour 421, 425

Jour 405 Publicity Methods (3)

Study and application of publicity planning and methods used by business firms, associations and similar groups. 2 lectures, 1 two-hour laboratory. Prerequisite: Jour 302

Jour 412 Public Relations (3)

Methods employed in dissemination of public information by business, agricultural, industrial, educational, and government organizations. Survey of media used, techniques commonly employed, formation and measurement of public opinion. 3 lectures.

Jour 413 Media and Public Opinion (3)

The role of public opinion and propaganda in mass media communication; evaluation of newspapers, periodicals and broadcast media as factors in formation of public opinion and propaganda; media responsibilities in contemporary society. 3 lectures. Prerequisite: Jour 412

Jour 421 Newspaper and Magazine Advertising (3)

Advertising psychology, advertising salesmanship, copy, layout, and production. Required for majors; recommended for students from other departments needing to know how to advertise and merchandise their own or others' products or services. 2 lectures, 1 laboratory. Prerequisite: Jour 233 or consent of instructor.

Jour 425 Advertising Layout and Copywriting (2)

Study of advertising typography and illustration, application of production processes in making of layouts and writing of copy. Emphasis on local newspaper and trade magazine advertising. 1 lecture, 1 two-hour laboratory. Prerequisite: Jour 421

Jour 427 Magazine Production (3)

Organization, editing and production of magazines, with special emphasis on trade, association and company publications. 2 lectures, 1 two-hour laboratory. Prerequisite: Jour 302

Jour 432 Broadcast Media News II (3)

Survey of radio and television research methods, listenership studies, national networks, local chains, independents, production and transcription services, contracts, writing of commercials, spot announcements. 2 lectures, 1 two-hour laboratory. Prerequisite: Jour 421

Jour 451, 452, 453 Applied Journalism Techniques (2) (2) (2)

Application of advanced journalism techniques in reporting, editing, public relations, photojournalism, advertising, combined with supervisory responsibilities for campus news media. 2 laboratories. Prerequisite: Senior status in Journalism.

Language/Library/Management

Jour 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

Jour 463 Undergraduate Seminar (2)

Discussion of major political, economic, and social developments that have public interest and significance to the journalist. Ethics of the press, its importance and responsibilities. Correlation of the various phases of journalism and relation of these to other fields. 2 lectures.

Jour 502 Supervision of School Publications (3)

Study of types of school publications with emphasis on student publications including the newspaper and yearbook; methods for organizing and supervising staff; production; integrating publication into the public relations picture; financing. 1 lecture, 2 laboratories. Prerequisite: Consent of instructor.

LANGUAGE

Lang 101, 102, 103 Foreign Language, Independent Study (3) (3) (3)

Independent supervised study arranged for students who wish individually to acquire basic skill in a foreign language. Instruction includes use of prerecorded and programmed materials. Not open for credit by examination.

Lang 123 Intensive English (3)

For the non-native speaker of standard English who needs additional work with English as a foreign language. Practice in pronunciation, sentence structure, reading and composition. Individual work in the language laboratory. 3 two-hour laboratories.

Lang 124, 125, 126 Intensive Composition (3) (3) (3)

Review of English fundamentals. Reading, letter writing, and composition. Introduction to forms of exposition and logic. Use of reference materials and preparation of term paper. Written composition with emphasis on the development of effective style. Writing of critical analysis papers. Also for the speaker of non-standard English. May be substituted for Eng 104, 105, 106. 3 lectures. Prerequisite: Satisfactory score on English language test.

Lang 522 Introduction to Teaching English as a Second Language (3)

Contrastive analysis of native and target language, methods and materials for testing and teaching English to non-native speakers: phonemic analysis, oral-aural drill, pattern practice, structure and grammar, composition, planning of curriculum materials from available resources. 3 lectures.

LIBRARY

Lib 101 Library Instruction (1)

Instruction and practice in the use of the card catalog, reference books, periodical indexes, government documents, and other library materials. Development of student independence and initiative in using the library as a source of information. 1 lecture.

MANAGEMENT

Mgt 201 Principles of Management (3)

The management process involving organization, decision-making, and managerial activities fundamental to all management levels and functional areas. Application to business firms, governmental agencies, hospitals, benevolent groups, and colleges. 3 lectures.

Mgt 311 Industrial Management (3)

Organization and functioning of management in industry. Planning, direction, and control of the business enterprise in terms of policy formation, organizational structure, finance, sales, procurement, plant location, facilities and production processes. 3 lectures. Prerequisite: Junior standing.

Mgt 331 Organization Theory (3)

Concepts of power, authority, and influence; communications, delegation and decentralization, decision and planning theory; formal organization structures, group decision making, considerations of values, social issues, and future trends in organizations. 3 lectures. Prerequisite: Mgt 201

Mgt 341 Planning and Decision Theory (3)

Development of a theory of planning, including foundation for theory, process of planning, role of participants in planning, auxiliary functions. Integration into a general theory development of decision making. Behavioral aspects. 3 lectures. Prerequisite: Mgt 201

Mgt 413, 414 Business Policies and Organization (3) (3)

Simulation and analysis of policy making and administration from a general management point of view. Problem analysis, decision making process, administration and control. Case study and continuous appraisal of policies and objectives under varying conditions. Capsheaf of the core curriculum. 3 lectures. Prerequisite: FPM 343

Mgt 418 Quantitative Methods and Controls in Business (3)

Basic principles of quantitative controls as applied to the fundamental operations of business. For the senior student who needs descriptive and operational knowledge as a background for application in business analysis and decision. 3 lectures. Prerequisite: Senior standing or consent of instructor.

MANUFACTURING PROCESSES

MP 125 Advanced Turning (3)

Theory and operational problems of manual and automatic lathe type machine tools. Evaluation of cutting tool geometry, tool performance, and material machinability. American Standard Association Charts, data and material classification. Optical and lineal instrumentation for quality control. 1 lecture, 2 laboratories. Prerequisite: MP 141, 151

MP 127 Manufacturing Processes Fundamentals (2)

Survey of materials and manufacturing processes. Possibilities and limitations of these processes. Application to fabrication of industrial products. Limited experience in conventional machine tool operation and use of semiprecision measuring tools. For non-engineering majors. 1 lecture, 1 laboratory.

MP 137 Introduction to Skills (2)

Technical vocabulary, English measuring system, blueprint reading, American industrial practice, classification of industrial skills. Introduction to modern American industrial processes including machining, welding, casting, and sheet metal working. Designed for international students. 1 lecture, 1 laboratory.

MP 141 Manufacturing Processes: Turning I (1)

Uses, capabilities, and operational characteristics of lathe type machine tools. Properties and classifications of tool and work materials. Tool geometry and its relationship to the mechanics of chip formation. External and internal turning problems. Linear measurements in quality control. 1 laboratory.

MP 142 Manufacturing Processes: Milling I (1)

Uses, capabilities, and operational characteristics of milling type machine tools. Plane surfacing problems, measurement of relative angular attitudes. Standard classification of tool types. Tool geometry of the rotational tool and its effect on the physics of metal cutting. Surface measurements in quality control. 1 laboratory.

Manufacturing

MP 143 Manufacturing Processes (1)

Methods of identification, classification and listing of the physical properties of metals used in fabrication processes. Engineering problems in processes used to control the effects of environment on gage metal components. 1 laboratory.

MP 144 Manufacturing Processes: Turning-Milling (2)

Combination of MP 141 and MP 142 allows students to complete two units of manufacturing processes with one instructor in one quarter. 2 laboratories.

MP 151 Drilling Technology (1)

Fundamentals of drilling machine operation, tool classification, selection and sharpening, use of hand tools, basic layout procedures. Physical properties of metals. For non-Engineering majors. 1 laboratory.

MP 153 Manufacturing Processes: Turning II (1)

Advanced problems of lathe type machine tools, both manually and automatically controlled. Evaluation of cutting tool performance and material machinability by use of the strain gage tool dynamometer. American Standard Association charts, data, and material classifications. Optical instrumentation for quality control. 1 laboratory. Prerequisite: MP 141

MP 154 Manufacturing Processes Milling II (1)

Advanced operations on milling machines. Application of milling machine accessories, fixtures and attachments. Increased emphasis on quality control. Drilling machine, metal cutting band saw, and hobbing mill. 1 laboratory. Prerequisite: MP 142

MP 155 Manufacturing Processes: Grinding (1)

Survey of abrasive machining and finishing. Selection and care of grinding wheels. Fundamental principles, use, capabilities, operational characteristics and safety standards employed in abrasive machining and finishing. 1 laboratory. Prerequisite: MP 153, 154

MP 221 Abrasive Machining and Finishing (2)

History and manufacture of grinding wheels, their selection and care. Fundamental principles, uses, capabilities, and operational characteristics employed in abrasive machining and finishing. Characteristics of grinder fluids. Safety standards, fixturing, and mounting of magnetic and nonmagnetic materials. 1 lecture, 1 laboratory. Prerequisite: MP 125, 154

MP 222 Advanced Machining Processes (3)

Theory and operation of machining exotic materials, using conventional electrical, chemical, and high energy methods. 1 lecture, 2 laboratories. Prerequisite: MP 221

MP 240 Additional Engineering Laboratory (1-2)

Advanced production and toolroom problems. Design and construction of laboratory tooling and instrumentation. Individual and group investigation of selected problems. Total credit limited to 4 units. 1 or 2 laboratories. Prerequisite: MP 153, 154. Concurrent MP 155

MP 321, 322, 323 Tool Design (3) (3) (3)

Design of manufacturing tools such as jigs, fixtures, and dies. Material selection, tolerance balancing, and quality control requirements as design factors. Field trips to manufacturing centers. 2 lectures, 1 laboratory. Prerequisite: MP 222, ET 344

MP 327 Tool Design (3)

Design of such special tools as jigs, fixtures, and punch press tools. Material selection. Field trip to manufacturing center. 2 lectures, 1 laboratory. Prerequisite: MP 155

MP 431, 432, 433 Tool Engineering (3) (3) (3)

Advanced tooling and production problems. Correlation of product design with production tooling. Supervision of special tool and fixture construction. Field trips to manufacturing centers. 1 lecture, 2 laboratories. Prerequisite: MP 155, 327

MP 434, 435, 436 Tool and Manufacturing Engineering (4) (4) (4)

Design, construction, and testing of jigs, fixtures, dies, and special tools for production. Field trips to manufacturing centers. 1 lecture, 3 laboratories. Prerequisite: MP 323

MARKETING

Mktg 204 Marketing Principles (4)

Basic marketing institutions and functions they perform in the marketing process. Management of marketing functions of the business firm in the economic, socio-cultural, and political environment. Industrial and consumer markets, marketing research, physical distribution, marketing communications, and marketing management. 4 lectures. Prerequisite: Ec 201 or 211 and sophomore standing.

Mktg 301 Marketing Analysis I (3)

Marketing information systems, information management, and decision-making. Application of modern methods to marketing problem definition, investigation, and problem solving. 3 lectures. Prerequisite: Stat 211

Mktg 304 Physical Distribution (3)

Systems analysis approach to the physical movement of goods and services through time and space from original producers to ultimate consumers. Channels of distribution to industrial and consumer markets. Packaging and packing, inventory management, loading and unloading, material handling, transportation. 3 lectures. Prerequisite: Mktg 301 or consent of instructor.

Mktg 305 Marketing Communications (3)

Application of behavioral sciences in management of marketing communications. Methods of communicating with industrial and consumer markets, suppliers, government and public institutions, and organizations. Oral, printed, and electronic media available; their characteristics, costs and limitations. 3 lectures. Prerequisite: Mktg 301 or consent of instructor.

Mktg 405 Field Sales Management (3)

Headquarters, staff, and field management of business representatives responsible for customer generation and service under minimum and infrequent supervision. Includes recruiting, training, organization, control, planning and evaluation of operations. 3 lectures. Prerequisite: Mktg 301 or consent of instructor.

Mktg 406 Marketing Management (3)

Planning, organizing, operating, and controlling individual brands and the total marketing activities of the business in coordination with all activities of the firm. 3 lectures. Prerequisite: Mktg 301 or consent of instructor.

Mktg 466 Marketing Problems Seminar (3)

Application of modern analytical methods to the exploration and analysis of current and potential marketing trends, opportunities, and problems. 3 meetings. Prerequisite: Senior standing, Mktg 301, and consent of instructor.

MATHEMATICS

*** Math 100 Mathematics for General Education (3)**

The number systems of mathematics through the real numbers; introduction to sets, relations, and functions; the properties of equality and inequality; absolute value; geometry of mathematics, including basic triangle relationships; coordinate systems, distance in a plane; trigonometric functions and identities. 3 lectures.

* Not open to students having credit in Math 141 or equivalent.

Mathematics

Math 102 Agricultural Mathematics (3)

Percentage problems in soils, dairy, horticulture, poultry, feeds; discount and interest, Pearson's square, equations, formulas, linear measurements, areas, volumes, concrete, lumber and proportions. 3 lectures.

* Math 103 Agricultural Mathematics (3)

Use of exponents, logarithms and elementary slide rule, trigonometric functions; basic land descriptions; work, horsepower and efficiency, pressure; standard deviation. Not open to students with credit in Math 117. 3 lectures. Prerequisite: Math 102

Math 104 Slide Rule (1)

Operation of the slide rule and methods of computation used in engineering. 1 lecture. Prerequisite: Trigonometry.

Math 110 Finite Mathematics for General Education (3)

Symbolic logic; sets and subsets, including set operations; partitions of universal sets; permutations and combinations; elementary probability using Venn diagrams of truth sets. 3 lectures. Prerequisite: Appropriate score on the placement examination, or permission of the instructor.

Math 113 Algebra (3)

Systems of integers; fractions; polynomials and factoring; linear equations and systems of linear equations; exponents and radicals. Exercises in agricultural problems. Enrollment limited to agricultural majors only. Not open to students with credit in Math 117 or Math 141. 3 lectures. Prerequisite: Appropriate score on placement examination.

Math 114 College Algebra (3)

Quadratic equations; graphical functions; inequalities; exponential and logarithmic functions; progressions; applications to agricultural problems wherever applicable. This course primarily intended for agricultural majors. Not open to students with credit in Math 117 or Math 141. 3 lectures. Prerequisite: Math 113 or appropriate score on placement examination.



* Not open to students having credit in Math 141 or equivalent.

*** Math 115 Trigonometry for Agriculture (3)**

Trigonometric functions of acute angles and related angles; graphs, radian measure, fundamental identities, functions of two angles, applications of right and oblique triangles, and logarithmic applications. Not open to students with credit in Math 117. 3 lectures. Prerequisite: Math 114

*** Math 117 College Algebra and Trigonometry (5)**

An integrated course in college algebra and trigonometry covering function concept and symbols, rectangular co-ordinates, trigonometric functions, linear and quadratic functions, inequalities, analysis of trigonometric functions, inverse trigonometric functions, exponential and logarithmic functions, systems of equations, binomial formula, and complex numbers. 5 lectures.

Math 119 Analytical Trigonometry for Engineers (3)

Rectangular and polar coordinates; trigonometric functions, fundamental identities; inverse trigonometric functions and relations; complex numbers. 3 lectures. Prerequisite: Appropriate score on placement test.

Math * 131, 132, 133 Technical Calculus (4) (4) (4)

Functions, their graphs and limits; techniques and applications of differential and integral calculus; introduction to applied differential equations. Designed principally for technology students and others interested in an applied three-quarter calculus sequence. 4 lectures. Prerequisite: Math 117, 115, or appropriate score on the entrance examination.

Math 141 Analytic Geometry and Calculus (4)

Introduction to analytic geometry and calculus. 4 lectures. Prerequisite: Math 117, Math 115, or appropriate score on the entrance examination.

Math 142 Analytic Geometry and Calculus (4)

Continuation of analytic geometry and calculus. 4 lectures. Prerequisite: Math 141

Math 143 Analytic Geometry and Calculus (4)

Continuation of analytic geometry and calculus. 4 lectures. Prerequisite: Math 142

Math 204 Mathematics of Matrices (3)

Matrices, inverses, linear systems, characteristic values, applications. 3 lectures. Prerequisite: Math 141 or permission of the instructor.

Math 210 Finite Mathematics for Business (3)

Vectors and matrices, including application of matrix theory to Markov chains; probability theory; linear programming; theory of games; absorbing Markov chains and genetics. 3 lectures. Prerequisite: Math 200

Math 215 Mathematics of Business (4)

Simple and compound interest principles, methods and applications; annuities; amortization of debts and sinking funds; perpetuities and capitalized costs. 4 lectures. Prerequisite: Math 210

Math 221 Calculus for Business (4)

Polynomial calculus for optimization; partial derivatives, and elementary integration. 4 lectures. Prerequisite: Math 210

Math 241 Analytic Geometry and Calculus (4)

Continuation of analytic geometry and calculus. 4 lectures. Prerequisite: Math 143

Math 242 Differential Equations (4)

Introduction to differential equations. Differential operators. 4 lectures. Prerequisite: Math 241

* Not open to students having credit in Math 141 or equivalent.

Mathematics

Math 304 Advanced Analysis for Science (4)

Algebra of vectors, vector functions, the del operator, vector field theory, curvilinear coordinates; Fourier series and transform; determinants and matrices. 4 lectures. Prerequisite: Math 242

Math 312, 313 Linear Algebra (3) (3)

Vector spaces, linear independence, subspaces, determinants, linear transformations, eigenvalues and eigenvectors, applications. 3 lectures. Prerequisite: Math 241

Math 318 Advanced Engineering Mathematics (4)

Theory and application of Fourier Series, Laplace transforms, Bessel functions, and power series solutions of ordinary differential equations. 4 lectures. Prerequisite: Math 242

Math 319 Partial Differential Equations (3)

Applications to vibrating strings, heat flow, flow of electricity, Legendre functions, Poisson equations and others. 3 lectures. Prerequisite: Math 318 or 304

Math 327, 328 Basic Structure and Concepts of Mathematics (3) (3)

Basic concepts, structure, and algorithms of elementary mathematics. An heuristic approach to topics in geometry, number theory, and measurement. Equations and inequalities in problem solving. Use of mathematical models to extend powers of induction and to introduce deductive processes. 2 lectures, 1 activity. Prerequisite: Junior standing and three units of college mathematics.

Math 381 Introduction to Modern Algebra (3)

Introduction to the concepts of modern algebra. Methods of proof, operations and relations defined on sets, cardinality, mathematical induction, the integers, the real number system, and introductory group theory. 3 lectures. Prerequisite: 9 units of college mathematics.

Math 382 Modern Algebra (3)

Concepts of modern algebra, including group isomorphism theorems, order of groups, introductory theory of rings, ideals, quotient fields, Euclidean rings, polynomials over a field, unique factorization domains. 3 lectures. Prerequisite: Math 381

Math 383 Modern Algebra (3)

Concepts of modern algebra, including extension fields, irreducible polynomials, constructible numbers, some elements of Galois' theory. 3 lectures. Prerequisite: Math 382

Math 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

Math 402 Secondary School Mathematics (3)

A study of the mathematical content of junior high school courses with particular emphasis on the new curricular materials that are being developed and introduced into the schools. Suitable for both upper grade and junior high school teachers. 3 lectures. Prerequisite: At least junior standing.

Math 403 Secondary School Mathematics (3)

A study of the mathematical content of the senior high school courses, with particular emphasis on the new curricular materials that are being developed and introduced into the senior high school courses. 3 lectures. Prerequisite: At least junior standing.

Math 404, 405 Vector Analysis (3) (3)

Algebra and calculus of free vectors, with applications; vector operators and vector field theory, with applications; the divergence theorem and Stokes' theorem, and their applications; general coordinates; introduction to tensors. 3 lectures. Prerequisite: Math 242

Math 408, 409 Functions of a Complex Variable (3) (3)

Fundamental properties of a complex variable; elementary analytic functions; mapping by elementary functions, with applications; complex integration and applications; Taylor and Laurent series expansions of functions; theory and applications of residues, poles, and contour integration; analytic continuation. 3 lectures. Prerequisite: Math 242

Math 410 Special Functions (3)

Analytical investigation, in the complex plane, of various transcendental functions: Gamma, Zeta, Bessel, Legendre, hypergeometric, elliptic and Theta functions. 3 lectures. Prerequisite: Math 409

Math 412 Advanced Calculus (3)

Real numbers system, Dedekind cuts, sequences, limits, continuity, derivatives and differentials, Riemann integration. 3 lectures. Prerequisite: Math 241

Math 413 Advanced Calculus (3)

Functions of several variables and partial differentiation, uniform continuity, theory of integration. Stieltjes integrals, infinite series, sequences of functions and uniform convergence. 3 lectures. Prerequisite: Math 412

Math 414 Advanced Calculus (3)

Continuation of advanced calculus topics including power series, double and triple integrals, and improper integrals. 3 lectures. Prerequisite: Math 413

Math 435 Teaching Mathematics in the Elementary School (3)

Development of mathematical concepts; the discovery or laboratory approach to learning and the role of manipulative or visual materials; teaching the mathematical rationale of the fundamental operations with the rational numbers; necessity for a sequential and organized program; the newer curricular materials and their place in the total program; problem solving; evaluation. 3 lectures. Prerequisite: Ed 304 and Math 327 or permission of the instructor.

Math 441 Theory of Numbers (3)

Properties of numbers. Euclid's Algorithm, greatest common divisor, least common multiple, indeterminate equations, prime numbers, congruences; emphasis toward the teaching of secondary mathematics. 3 lectures. Prerequisite: At least junior standing and Math 141

Math 442 College Geometry (3)

Modern development of the basic concepts of plane and solid Euclidean geometry including a coordinate treatment; selected topics in advanced Euclidean geometry. 3 lectures. Prerequisite: Junior standing.

Math 443 Non-Euclidean Geometry (3)

Review of attempts to prove Euclid's fifth postulate as a point of departure in the discovery of non-Euclidean geometry; building an axiom system free of intuitive prejudice; hyperbolic plane trigonometry. Particularly appropriate for the prospective or in-service teacher. 3 lectures. Prerequisite: Math 442

Math 444 Projective Geometry (3)

Geometric and algebraic treatment of such topics as primitive forms, ideal elements, incidence and duality. Certain geometric properties preserved by projections; and construction of special figures. 3 lectures. Prerequisite: Junior standing. Math 442 recommended.

Math 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

Mathematics

Math 463 Undergraduate Seminar (2)

Reports and discussions by students, through seminar methods, of their senior projects, as well as other topics of mathematical interest; discussions by students of curricular relevance to their needs and interest. 2 activity periods.

Math 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

Math 505 Sets, Functions and Relations (3)

Introduction to the basic concepts of sets with applications to functions, relations and graphs. Appropriate for the prospective or in-service teacher. 3 lectures. Prerequisite: Graduate standing or the consent of instructor.

Math 506 Topics in Modern Algebra (3)

Galois' theory, splitting fields, solvability by radicals, the algebra of linear transformations, homomorphisms of vector spaces. 3 lectures. Prerequisite: Math 382 and 312 or equivalent, and graduate standing.

Math 507 Structure of Geometry (3)

Transformations and geometries; affine, topological and analytic. Appropriate for the prospective or in-service teacher. 3 lectures. Prerequisite: Graduate standing or consent of the instructor; Math 442 recommended.

Math 508 Introduction to Topology (3)

Basic ideas of topology from intuitive and set-theoretic standpoint. Appropriate for the prospective or in-service teacher. 3 lectures. Prerequisite: Graduate standing or consent of the instructor.

Math 509 History of Mathematics (3)

A study of men, concepts and techniques prominent in the evolution of mathematics from earliest times to the present. Appropriate for prospective and in-service teachers. 3 lectures. Prerequisite: Graduate standing or consent of the instructor.

Math 510 Survey of Modern Mathematics (3)

Selected topics from the field of modern mathematics: projective, and synthetic geometry, topology, logic, matrices, vectors, theory of games, probability, linear and modern algebra and convex sets. 3 lectures. Prerequisite: Graduate standing or instructor's approval.

Math 512, 513 Partial Differential Equations of Physical Systems (3) (3)

Partial differential equations of first and second order. Laplace's equation, wave equation, diffusion equation, and others; methods for their analytical solution. 3 lectures. Prerequisite: Math 318 and graduate standing.

Math 514 Approximations, Metric Spaces and Linear Analysis (3)

Function spaces. Approximation and metric spaces. Contraction mappings and applications, inner product and normed linear spaces. Hilbert spaces and mean square approximations. Complete orthonormal systems and applications. Linear operators and eigenvalue expansions. 3 lectures. Prerequisite: Math 313, 409, 413 or instructor approval.

Math 515 Real Analysis (3)

Introduction to Lebesgue measure and integration, convergence theorems, L_p spaces, Radon-Nikodym theorem, and Fubini's theorem. 3 lectures. Prerequisite: Math 514 or instructor approval.

Math 516 Linear Operators (3)

Linear spaces, operator theory, and operational calculus. Applications to differential equations, integral equations, transforms, and Fourier analysis. 3 lectures. Prerequisite: Math 313, 319, 412 and graduate standing.

Mathematics/Mechanical Engineering

Math 518 Advanced Ordinary Differential Equations (3)

Existence, continuation and dependence on parameters of solutions. Linear systems, initial and boundary value problems. Self-adjoint eigenvalue problems. 3 lectures. Prerequisite: Math 514 or instructor approval.

Math 521 Curriculum and Methods in Mathematics (3)

General aims, objectives and methods of effective teaching of mathematics in the secondary schools. The traditional secondary curriculum will be compared with new trends and developments. 3 lectures. Prerequisite: Graduate standing.

Math 540 Foundations for Quantitative Methods (4)

Intensive foundation course for the MBA program. Elements of finite and linear mathematics, probability theory, and introduction to calculus. Emphasis upon model building and decision making in business and economics. 4 lectures. Prerequisite: Graduate standing.

Math 580 Seminar (1-2-3)

Built around topics in advanced mathematics chosen according to the common interests and needs of the students enrolled. Each seminar will have a subtitle according to the nature of the content. 1, 2, or 3 lectures. Total credit limited to 6 units. Prerequisite: Graduate standing and consent of instructor.

Math 593 Seminar in Applied Mathematics (3)

Topics based on the interests and backgrounds of the students. Applications of mathematics to problems in engineering and science. 3 meetings. Prerequisite: Graduate standing and consent of instructor.

Math 596 Thesis (3) (3)

Serious research endeavor devoted to the development, pedagogy or learning of mathematics. Prerequisite: Graduate standing and consent of instructor.

MECHANICAL ENGINEERING

ME 134, 136 Mechanical Systems (4) (4)

Analysis, synthesis, and testing of mechanical and thermal systems, their components and instruments. 2 lectures, 2 laboratories.

ME 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

ME 205 Engineering Statics (3)

Statics by scalar methods. Includes forces, couples, resultants, equilibrium, trusses, cables, friction, centroids, and moments of inertia. For Engineering Technology students. 3 lectures. Prerequisite: Phys 121, Math 132, or Phys 131, Math 142

ME 206 Engineering Dynamics (4)

Dynamics by scalar methods. Includes kinematics (both absolute and relative motion of particle and bodies) and kinetics, force, mass, acceleration, work and energy, and impulse and momentum. For Engineering Technology students. 4 lectures. Prerequisite: ME 205 or ME 211

ME 211, 212 Engineering Mechanics (3) (4)

General and specific consideration of moments, couples, centroid, multidimensional systems. Field concepts as applied to rigid bodies. Motion, momentum, and energy. Application of vector methods. 3 lectures, 4 lectures. Prerequisite: Phys 131, Math 142

ME 231 Mechanical Equipment of Buildings (3)

Application of engineering analysis and building code requirements in the design of building systems for handling water supplies, liquid wastes, fuel, gas and ventilation. Related systems connecting groups of buildings and health and accident hazards involved. 2 lectures, 1 laboratory. Prerequisite: Phys 132

Mechanical Engineering

ME 234 Mechanical Engineering Systems (4)

Analysis, synthesis and testing of mechanical and thermal systems, their components and instruments. For qualified transfer students. 3 lectures, 1 laboratory. Prerequisite: Approval of department head.

ME 240 Additional Engineering Laboratory (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

ME 301 Thermodynamics (4)

Fundamental concepts of work, heat, and energy. First and second laws of thermodynamics. Ideal gas law as introduction to incompressible flow. Power and refrigeration cycles. Combustion and gas mixtures. For Engineering Technology students. 4 lectures. Prerequisite: Math 133, Phys 123, ME 206 or 212

ME 302, 303 Thermodynamics (3) (3)

First and second laws of thermodynamics, processes, properties, and general relationships. Gases, vapors, mixtures. 3 lectures. Prerequisite: ME 212, Chem 124, Phys 132

ME 311 Fluid Mechanics (3)

Study of the principles that underlie the flow of various fluids. Fluid statics, viscosity, dynamic similarity, and fluid friction. Dimensional analysis, Reynolds number, steady flow energy transformation of compressible and incompressible fluids. Fluid resistance, dynamic lift and propeller action, propulsion theory. Pumps, turbine, fluid power transmission systems, and fluid film lubrication. For Engineering Technology students. 3 lectures. Prerequisite: ME 206 or 212

ME 316 Mechanical Vibrations (3)

Free vibration, damping, transient and steady state response to forced vibrations. Engineering methods, single and multiple degrees of freedom, natural frequencies of distributed mass systems. 3 lectures. Prerequisite: Math 242, ME 212

ME 317 Vibrations Laboratory (1)

Experimental studies of the dynamic behavior of structures and machines. Instrumentation methods utilized in field and laboratory. Analog techniques. 1 laboratory. Concurrent: ME 316

ME 324 Kinematics (4)

The study of motion in machine parts. Displacements, velocities, and accelerations in linkage, cams, gears, and other mechanisms. 2 lectures, 2 two-hour laboratories. Prerequisite: Phys 131, ET 142, ME 212

ME 341, 342 Fluid Mechanics (3) (4)

Fluid statics and dynamics. Flow measurement, networks, open channels, compressible flow, fluid machinery and control systems. 3 lectures; 3 lectures, 1 laboratory. Prerequisite: ME 212

ME 343 Thermodynamics Laboratory (1)

Testing thermodynamic equipment and machinery. An advanced laboratory course requiring the student to determine the test procedure and instrumentation and to evaluate the degree of exactness or uncertainty of the test setup. 1 laboratory. Prerequisite: ME 303, EnvE 313

ME 349 Advanced Materials Testing Laboratory (1)

Advanced laboratory work in testing of materials and structures. Column and beam tests, fatigue tests, static and dynamic experimental stress analysis techniques with electric resistance strain gages and brittle lacquer coatings. 1 laboratory. Prerequisite: Aero 229

ME 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

ME 401, 402 Stress Analysis (4) (4)

Shrink and force fits, torsion of noncircular members, plates and shells and other current stress analysis problems. Triaxial stress, strain and material behavior. Energy methods in stable and unstable structures. Experimental stress analysis. 3 lectures, 1 laboratory. Prerequisite: Math 318, ME 212, Aero 207

ME 412 Nuclear Power Plants (3)

Engineering applications of nuclear energy, nuclear reactor design and operation, instrumentation and control. Nuclear power plants; materials, equipment and economics. 3 lectures. Prerequisite: Chem. 124

ME 417 Advanced Vibrations (4)

Vibration of continuous systems and wave motion, orthogonality of normal modes, Lagrangian mechanics, matrix methods of lumped mass systems, mode coupling and iteration methods. 3 lectures, 1 laboratory. Prerequisite: ME 316

ME 422 Mechanical Control Systems (4)

Analytical modeling and compensation of mechanical control systems. Design of mechanical, hydraulic and fluid systems using analog and digital simulation techniques. 3 lectures, 1 laboratory. Prerequisite: EL 322, Math 242, ME 316

ME 423 Elements of Machine Design (4)

Fundamentals of machine design for engineering students other than mechanical. Stresses and deflections in machine parts. Engineering materials. Design of springs, bearings, gears, chains, belts, clutches and brakes. Course is oriented to stress philosophy of design, application and comparative advantage rather than basic design. 3 lectures, 1 laboratory. Prerequisite: Aero 207, or equivalent, Math 241, ME 212

ME 424, 425 Design of Piping Systems (4) (4)

Functions, requirements, and design of piping systems, including safety and economic considerations for power, chemical, and process plants. Welding and other forms of joint construction, materials specifications, sizing, layout, flexibility, support, insulation, and cost estimation of water, steam, air, gas, and corrosive and viscous fluid systems. Philosophy, background, and requirements of principal governing National Codes. 3 lectures, 1 laboratory. Prerequisite: Aero 207, ME 341

ME 426 Engineering Analysis of Dynamic Systems (3)

Lagrangian mechanics. Studies of advanced problems in the kinematics and kinetics of engineering systems. 3 lectures. Prerequisite: Math 318, ME 316

ME 427 Introduction to Design (4)

Design of machine parts by stress and deflection. Effects of fluctuating stresses and stress concentration. Design of gears, clutches, brakes, bearings, shaft and other machine parts. Modern industrial design practice using standard components and design layout drawings. 3 lectures, 1 laboratory. Prerequisite: Aero 207, Aero 229 (or concurrent), ET 142, WM 306

ME 428 Design (4)

Basic design techniques such as brainstorming, feasibility studies, models, case studies, design decisions and compromises. Industrial participation design program. 2 lectures, 2 laboratories. Prerequisite: ME 427

ME 431 Mechanical Design Technique (3)

Comprehensive study of design methods. Design factors, including market value, producibility, servability, utility, style. Analysis of useful ideas and their integration into a practical design in the form of an engineering layout drawing. 1 lecture, 2 laboratories. Prerequisite: ME 428

ME 434 Fundamentals of Petroleum Production (2)

Survey of the production of crude petroleum covering exploration, drilling, pumping, transportation, and storage. Observation of actual field operations and installations of major oil companies and oil equipment companies. Nomenclature, methods, and mechanical equipment. 2 lectures. Prerequisite: ME 136, 302

Mechanical Engineering

ME 435 Petroleum Production Development (3)

Mechanical engineering aspects of rotary drilling. Problems attendant to the rotary rig and its auxiliary equipment. Practical problems dealing with drilling mud, casing, cementing, directional drilling, and well completion operations. 2 lectures, 1 laboratory. Prerequisite: Aero 207

ME 436 Petroleum Reservoir Engineering (3)

Methods of applied engineering in the operation of oil and gas reservoirs. Flow of fluids through porous media under primary and secondary recovery. Modern stimulation techniques of nuclear detonation, steam injection, and hydraulic fracturing. 3 lectures. Prerequisite: ME 341

ME 441 Advanced Thermodynamics (4)

Maxwell relations, clapeyron equation, activity, activity coefficient, and fugacity. Phase and chemical equilibrium. Selected modern applications of thermodynamics. 4 lectures. Prerequisite: ME 303

ME 442 Dynamics and Thermodynamics of Compressible Flow (4)

Control volume analysis of fluid-thermo equations for one dimensional, compressible flow involving area change, normal shocks, friction, and heat transfer. Two-dimensional supersonic flow including linearization, method of characteristics, and oblique shocks. One-dimensional constant area, unsteady flow. 4 lectures. Prerequisite: Math 242, ME 303, 342

ME 443 Turbomachinery (3)

Performance characteristics. Two-dimensional cascades. Axial flow turbines. Axial flow compressors, pumps and fans. Three-dimensional flows in axial turbomachines. Centrifugal pumps, fans and compressors. 3 lectures. Prerequisite: ME 303, 342, Math 318

ME 444 Combustion Engine Design (3)

Application of design parameters to the various engine cycles. Aspects of the combustion processes. Energy conversion including losses and cooling. Static and dynamic loading. 3 lectures. Prerequisite: ME 303

ME 445 Convective Heat and Mass Transfer (4)

Forced convection in laminar and turbulent flow, free convection, diffusion, combined heat and mass transfer. 4 lectures. Prerequisite: ME 341, EnvE 313

ME 452 Nuclear Engineering Laboratory (1)

Radioisotope engineering experiments, analog computer simulation of reactor operation and control variables, and mechanical design problems. 1 laboratory. Prerequisite: Phys 421. Concurrent: ME 412

ME 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: Senior standing.

ME 463 Undergraduate Seminar (2)

New developments, policies, practices, and procedures are discussed through regular seminar. Each individual is responsible for the development and presentation of a topic in his chosen field. 2 meetings. Prerequisite: Senior standing.

ME 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

MILITARY SCIENCE

*MSc 101, 102, 103 (MS I) Basic Course (1)(1)(1)

Organization of the United States Defense Establishment and its role in foreign policy implementation; introduction to personnel management problems as related to a military environment. 1 lecture.

*MSc 201, 202, 203 (MS II) Basic Course (2)(2)(2)

American Military History from the colonial period to the present; battles and campaigns; factors influencing our present military system and associated developments which have contributed to U.S. military action. Tactical principles and land navigation by the use of topographic maps. 2 lectures.

*MSc 301, 303 (MS III) Advanced Course (4)(4)

Personnel management problems and techniques of motivation as applied to a military environment; techniques and methods of instruction; tactical problems and techniques adaptable to the small military organization; control measures (communications). 4 lectures.

*MSc 401, 403 (MS IV) Advanced Course (4)(4)

The United States Army's role as applied to present national defense goals; a review of the Army's organizational relationships and staff operating procedures; logistics and administration; the military team concept; the code of military justice. 4 lectures.

MUSIC

Mu 101 Music Theory (3)

Elements of music theory covering: notation, construction of major and minor scales and keys, signatures, intervals, diatonic triads, triad forms, inversions, transposition, study of meter and rhythm, elementary ear training. 3 lectures.

Mu 111, 112, 113 Class Piano (1) (1) (1)

Fundamentals of piano techniques, tone production, rhythm, sightreading, interpretation, style, and keyboard facility for those with little or no piano experience. Designed to meet the piano requirements for music minors. The classes proceed progressively. 1 activity.

Mu 141 Dance Orchestra (2)

Limited to those who have had considerable experience playing musical instruments. Students in the dance orchestra have an opportunity to play for various College entertainments, dances, community programs, radio broadcasts, and the annual spring tour and Home Concert. 2 laboratories. Total credit limited to 24 units.

Mu 144 Symphony Orchestra (1)

Open to any college student whose technique is adequate. In addition to standard repertory, the orchestra emphasizes unusual or rarely performed works. Select members of the orchestra are given additional opportunities to perform chamber music. 1 laboratory. Prerequisite: Consent of instructor. Total credit limited to 12 units.

Mu 147 Instrumental Ensembles (1)

Open to qualified musicians. Rehearsal and public performances in trios, quartets, and quintets. 1 activity. Prerequisite: permission of the instructor. Total credit limited to 12 units.

* Students who are participants in the ROTC program are required to take for no additional academic credit one hour of field instruction in all Military Science courses.

Music

Mu 151 Band (1)

Limited to those students who have had experience with band instruments. The band plays for many college functions, assemblies, athletic games, and rallies, and makes at least one trip each year. Smaller groups are organized from the band for special functions. 1 laboratory. Total credit limited to 12 units.

Mu 154 Men's Glee Club (1-2)

Four- to eight-part vocal compositions; fundamentals of breathing, tone production, diction, and interpretation. Quartets, small groups, and soloists are developed, for which additional credit may be given. The club sponsors an annual spring tour and Home Concert. Tryouts in fall only. 1 or 2 laboratories. Total credit limited to 24 units.

Mu 155 Chamber Singers (1)

Study and public performance of chamber music for mixed voices from the sixteenth century to the present. Total credit limited to 12 units. 1 laboratory. Prerequisite: Permission of instructor.

Mu 157 Women's Glee Club (1-2)

Choral literature for women's voices; independence and skill in part singing; care and development of the voice; choral interpretation; performances in public concerts, campus functions, and the annual Home Concert. Small groups and soloists may earn additional credit. 1 or 2 laboratories. Prerequisite: Permission of the instructor. Total credit limited to 24 units.

Mu 201 Basic Music (3)

Development of basic music proficiency; singing, conducting, playing simple instruments, accompaniment, rhythmic activities. Assumes a knowledge of music fundamentals. 3 lectures. Prerequisite: Mu 101

Mu 203 Elementary Harmony (3)

Melodic form; recognition, construction, and use of primary chords and inversions; cadences, enharmonic change, harmonization of simple melodies, and arranging for four-part strings. 3 lectures. Prerequisite: Mu 101

Mu 204, 205, 206 Appreciation (3) (3) (3)

Introduction to the elements and concepts of music, leading to greater understanding of art music. Discussion of the styles, forms, and specific composers in Western music. May be taken in any order. 3 lectures.

Mu 208 Ethnic Music of the World (3)

Contemporary concepts of ethnomusicology. Discussion of folk music of the world by geographic area. History and development of musical instruments. May be repeated to 12 units. 3 lectures.

Mu 211, 212, 213 Class Piano (1) (1) (1)

Intermediate level piano techniques with emphasis on style, interpretation, sight-reading, basic performance practices, and the solution to general musical problems. The classes proceed progressively. Total credit in each course limited to 2 units. 1 activity. Prerequisite: One year of piano or equivalent.

Mu 214, 215, 216 Music in Civilization (1) (1) (1)

Music integrated within the framework of ideas or chronology of a selected course in the humanities. 1 lecture. Concurrent enrollment in Hist 101, 102, 103 required.

Mu 231, 232, 233 Instruments—Theory and Performance (1) (1) (1)

Study of the fundamentals of playing and teaching woodwind, brass, string, and percussion instruments. Separate sections arranged with instructor. 1 activity.



Mu 237, 238, 239 Voice—Theory and Performance (1) (1) (1)

Study of the fundamentals of singing; breathing, posture, diction, development of voice, resonating chambers, vocal interpretation, sight singing. Theory of music as applied to voice production; notation, intervals, triad forms, meter and rhythm, major and minor scales. 1 activity.

Mu 241 Functional Keyboard (1)

For the classroom teacher. Simple accompaniments used in classroom song books, reading simple piano scores from the teacher's manual. Simple folk songs and appropriate chording. Recommended in conjunction with Mu 201. 1 activity.

Mu 307, 308, 309 Conducting (2) (2) (2)

Principles and techniques in conducting with experience in score reading. 2 lectures.

Mu 311, 312, 313 Class Piano (1) (1) (1)

Designed for the advanced and semi-advanced student. Emphasis on general knowledge of piano literature, interpretation, style, and performance practices. Admittance to the class by audition. Fall quarter emphasis, Baroque keyboard literature; winter quarter, Classic; spring quarter, Romantic and Contemporary. Total credit in each course limited to 2 units. 1 activity.

Mu 331, 332, 333 Instruments (1) (1) (1)

Study of the fundamentals of playing and teaching woodwind, brass, string, and percussion instruments. Continuation of Mu 231, 232, 233. 1 activity.

Mu 337, 338, 339 Voice (1) (1) (1)

Study of the fundamentals of singing; breathing, posture, diction, development of voice, resonating chambers, vocal interpretation, sight singing. Theory of music as applied to voice production; notation, intervals, triad forms, meter and rhythm, major and minor scales. Continuation of Mu 237, 238, 239. 1 activity.

Music/Natural Resources

Mu 404, 405, 406 History of Music (2) (2) (2)

Intensive study of a selected topic in music history each quarter through the use of readings, recordings, and scores. Prior completion of at least one quarter of music appreciation is recommended. 2 lectures.

Mu 407 Form and Analysis (3)

Intensive survey of musical forms from the 17th century to the 20th century. Analysis of musical structure, melodic invention and elaboration. 3 lectures. Prerequisite: Mu 101

Mu 431, 432, 433 Advanced Instruments—Theory and Performance (1) (1) (1)

Emphasis placed on the physiological and acoustical principles of tone production. Selected readings on the history and literature of each family of instruments. 1 activity.

Mu 436 Music Concepts (3)

Creative approach to history, theory, appreciation, and criticism of music. Currently employed materials in the light of new musicological findings. Development of original musical themes utilizing scalar, chordic, and pentatonic approaches. 3 lectures. Prerequisite: Mu 201 or consent of instructor.

Mu 437, 438, 439 Advanced Voice—Theory and Performance (1) (1) (1)

Selected readings in the theory of voice production. Study of many types of vocal literature. 1 activity. Prerequisite: Mu 237

NATURAL RESOURCES MANAGEMENT

NRM 101 Recreation Systems and Management (3)

Introduction to national, state, county, city and private park systems. History, policy and principles of the formation, administration and functioning of recreational limits at the park, district and regional levels. 3 lectures.

NRM 102 Forest Resources (3)

Fundamentals of forestry including basic silviculture, forest protection, and multiple use of forest lands. Emphasis is placed on forest recreation. 3 lectures.

NRM 112 Introduction to Natural Resources Management (3)

Natural resources of the United States: forests, minerals, water, wildland and wildlife. Development, management, and utilization of our natural resources for the continuous benefit of man and conservation of the resources. 3 lectures.

NRM 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

NRM 206 Resource Planning (3)

Analysis and development of plans for land resource uses including survey and inventory application of multiple use principles. Projection of use demands, economic evaluations, and priority assessments. 3 lectures. Prerequisite: NRM 101, 102

NRM 221 Lake Management (3)

Practices and management of recreational lakes to provide maximum use, to reduce aquatic pests, to provide necessary water quality, and to attract or produce aquatic animals associated with hunting and fishing preserves, farm ponds, and ornamental and recreational waters. 2 lectures, 1 laboratory. Prerequisite: NRM 101 or 102

NRM 223 Resource Survey (3)

Survey, inventory and assessment techniques used for evaluation of physical, biological and cultural resource features of a land area. Interpretation and correlation of geology, soils, topographic, climatic, vegetative and cultural maps. 2 lectures, 1 laboratory. Prerequisite: NRM 206

NRM 302 Natural Resources Policy (3)

Historical development and significance of natural resource policies including changing patterns between private and public enterprise and federal, state, and local government in resource management. 3 lectures. Prerequisite: NRM 101 or 102, NRM 212

NRM 312 Resource Law Enforcement (2)

Law enforcement applied to natural resource conservation. Development of laws; laws of arrest, search, and seizure; rules of evidence; court structure; and court procedures. Laws of parks, forestry, wildlife, and water quality control. 2 lectures. Prerequisite: NRM 101 or 102

NRM 323 Ecology of Resource Areas (3)

Interrelationships of the environmental features of a resource area as influences on development of the recreational site and human use. 2 lectures, 1 laboratory. Prerequisite: Bot 123; Bio 325

NRM 326 Environmental Interpretation (3)

Interpretation of the biological, physical and aesthetic values of the recreation area environment; organization and presentation of interpretive materials by oral, written, and display methods of communication. 2 lectures, 1 laboratory. Prerequisite: NRM 323 and Junior standing.

NRM 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

NRM 421 Water Oriented Recreation (3)

Practices of management of water oriented outdoor recreation on private and public waters. Consideration of shoreline development, water surface time and space zoning, and underwater development. 2 lectures, 1 laboratory. Prerequisite: NRM 221

NRM 429 Site Development and Maintenance (4)

Basic planning and design principles of selected outdoor recreation sites. Area layout, facility design, construction, and maintenance of structures, grounds, roads, and trails. 3 lectures, 1 laboratory. Prerequisite: NRM 326

NRM 438 Recreation Resource Management (4)

Administration of private and public outdoor recreation, including interrelationships among planning, budgeting, organizing, programming, interpreting and maintaining the recreational unit. 3 lectures, 1 laboratory. Prerequisite: NRM 429 and senior standing in the major.

NRM 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

NRM 463 Undergraduate Seminar (2)

Study and oral presentation of current developments and problems in the subject field. Discussion of recent findings and research and their application. 2 lectures.

Ornamental Horticulture

NRM 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

NRM 502 Resource Conservation (3)

Conservation developments for broad treatment of land, water, mineral, forest, range, and wildlife resources. 3 lectures. Prerequisite: Graduate status, Cons 311, SS 202, SS 321, SS 433



ORNAMENTAL HORTICULTURE

OH 100 Orientation to Ornamental Horticulture (1)

Ornamental Horticulture as a career. Preview of the nursery, florist, and landscape industries. Discussion of student projects and project records. 1 lecture.

OH 121 Nursery Practices (4)

Commercial nursery operations. Propagation, nursery layout, seed sowing, transplanting, potting, canning, fertilizing, irrigation, and pest control. Bedding plants, greenhouse plants, trees, and shrubs. 3 lectures, 1 laboratory.

OH 122 Plant Materials I (4)

Shrubs and vines used in California. Identification, habits of growth, cultural requirements, and landscape use. 3 lectures, 1 laboratory.

OH 123 Floriculture (4)

The operating of greenhouses and other forcing structures. A study of the relationship of light, heat, temperature, and moisture to plant growth. 3 lectures, 1 laboratory. Prerequisite: OH 121

OH 124 Landscape Drafting (2)

Drafting techniques and standards progressing from tracings to light construction working drawings. 1 lecture, 1 laboratory.

Ornamental Horticulture

OH 125 Floral Design (4)

A study of the principles of flower arrangement and corsage making. 2 lectures, 2 laboratories.

OH 126 Plant Materials II (4)

The identification, habits of growth, and landscaping uses of ornamental annuals and herbaceous perennials commonly grown for California landscaping. 3 lectures, 1 laboratory. Prerequisite: OH 121, 122

OH 145 Bonsai Culture (2)

Study of the philosophy, history, training, culture, production, and care of the Japanese Bonsai. 1 lecture, 1 activity.

OH 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

OH 220 Flower Arrangement (2)

Principles and uses of flower arrangements as used in home decorating. 1 lecture, 1 laboratory.

OH 221 Plant Materials III (4)

Broadleaf trees grown and used in California. Identification, habits of growth, cultural requirements, and landscape use. 3 lectures, 1 laboratory.

OH 223 Principles of Landscape Design (4)

Basic principles of design related to landscape problems. 2 lectures, 2 laboratories. Prerequisite: OH 124

OH 225 Flower Judging (3)

Procedure and practice in score card grading of cut flower and pot plant classes. Commercial grades will be used as well as specimens generally grown by the amateur gardener. 1 lecture, 2 laboratories. Prerequisite: OH 121

OH 227 Flower Shop Management (4)

Practices and problems in the management of the retail flower shop with emphasis upon shop layout, window display, telegraph delivery services, buying, selling, and personnel relations. 2 lectures, 2 laboratories. Prerequisite: OH 125

OH 228 Advanced Floral Design (4)

Advanced styling of floral designs including: wedding flowers, funeral designs, advanced corsages, hospital arrangements and baskets for all occasions. 2 lectures, 2 laboratories. Prerequisite: OH 227

OH 230 Ornamental Gardening (3)

For non-horticulture majors. Information and recommendations for the home gardener. Methods of propagation, pruning, planting, soils, fertilizers, lawn planting and maintenance, pest and weed control, home landscaping, and identification and care of house plants. 2 lectures, 1 laboratory.

OH 233 Plant Propagation (4)

Principles of asexual propagation. Budding, cutting, layering, division, and separation. 3 lectures, 1 laboratory. Prerequisite: OH 123

OH 321 Residential Landscaping (4)

Principles of landscape design for residential properties. Designing of several small home properties. 2 lectures, 2 laboratories. Prerequisite: OH 122, 221, 223

OH 322 Advanced Landscape Design (4)

Principles of landscape design of public properties and the application of these principles in solving of landscape design problems. 2 lectures, 2 laboratories. Prerequisite: OH 121, 221, 223

Ornamental Horticulture

OH 323 Greenhouse Management (4)

Scheduling greenhouse crops and planning crop rotations. Economics of the florist business. 3 lectures, 1 laboratory. Prerequisite: OH 123

OH 324 Tropical Plant Culture (4)

Identification, culture, propagation, and ornamental use of tropical plants. 3 lectures, 1 laboratory. Prerequisite: Junior standing and permission of instructor.

OH 325 Pot Plant Production (4)

The production of major commercial potted plants under glass and lath. Preparation for sale and merchandising of greenhouse crops. 3 lectures, 1 laboratory. Prerequisite: OH 334, SS 221

OH 327 Diseases and Pests of Ornamental Plants (4)

A detailed study of diseases and pests of ornamental plants, their effect on plants, their prevention and control. 3 lectures, 1 laboratory. Prerequisite: OH 122, Ent 126, Bot 323

OH 331, 332 Landscape Contracting (4) (4)

Practices in supervising men and applying approved techniques in landscape construction. Cost finding and estimating for landscape trades. Contract writing, accounting systems, and legal aspects of landscape contracting. 3 lectures, 1 laboratory. Prerequisite: OH 124

OH 333 Turf Management (4)

Practice in the maintenance and management of turf areas, including golf greens, athletic fields and park lawns. 3 lectures, 1 laboratory. Prerequisite: OH 121, and junior standing.

OH 334 Cut Flower Production (4)

The production of cut flowers in the field, under cloth, and under glass. Preparation of cut flowers for market. 3 lectures, 1 laboratory. Prerequisite: OH 123, SS 221

OH 337 Park Planning and Management (4)

Design, management and maintenance of private and public parks and recreational areas. 3 lectures, 1 laboratory. Prerequisite: AE 122, OH 122, 221, 333

OH 338 Advanced Plant Propagation (4)

Advanced nursery and plant propagation practices. Grafting, dormant budding, lining out, balling out, bare rooting, and making hardwood cuttings. Construction and operation of forcing structures. 3 lectures, 1 laboratory. Prerequisite: OH 233

OH 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

OH 402 Garden Center Management (4)

Legal aspects and economics of operating a commercial nursery and garden center. State and county regulations, quarantines, grades and standards of nursery stock. Purchasing, merchandising and record keeping. Trade associations and co-operative buying. 3 lectures, 1 laboratory. Prerequisite: Ec 201 or 211, Actg 131, junior or senior standing.

OH 421 Arboriculture (4)

The care and management of large ornamental trees. The use of ropes and other safety equipment in tree climbing. Cavity work, bracing, cabling, and pruning. 3 lectures, 1 laboratory. Prerequisite: OH 221, 327

OH 430 Landscape Plants (2)

The identification and landscape use of trees, shrubs and herbaceous plant materials. For non-OH majors. 1 lecture, 1 laboratory.

OH 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

OH 463 Undergraduate Seminar (2)

An open forum of senior students in which the latest developments, practices, and procedures are discussed. Each student is responsible for the development and presentation of a topic in his chosen field. 2 lectures.

OH 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

OH 581 Graduate Seminar in Ornamental Horticulture (3)

Group study of current problems of the ornamental horticulture industry; current experimental and research findings as applied to production and to the teaching of horticulture.

PHILOSOPHY

Phil 201 Introduction to Philosophy (3)

The relationships among the sciences and between science and philosophy. The principal types of philosophy in their relation to science. How philosophy has influenced the growth of ideas in the sciences and how present scientific developments are related to basic philosophical ideas. 3 lectures.

Phil 202 Logic (3)

Brief survey of classic deductive and inductive logic. Methods of clear thinking in English prose sentences. Analysis of fallacies. Introduction to modern symbolic logic including Boolean algebra of classes and propositions, with applications. 3 lectures.

Phil 204 Ethics (3)

Implications of ethics and ethical systems; scientific inquiry into the principles of the morality of human actions. 3 lectures. Prerequisite: Phil 201 or instructor's permission.

Phil 211 History of Philosophy (3)

Western philosophy and science from its beginnings to the modern era. The Pre-Socratics through Democritus, Plato and Aristotle to Descartes, Spinoza, Leibnitz, Locke, Berkeley, Hume, and Kant. 3 lectures. Prerequisite: Phil 201

Phil 302 World Religions (3)

Survey of the major living religions of mankind, their histories, teachings about man, his origin, way of life and destiny. 3 lectures.

Phil 311 Philosophy of Science (3)

The methods of physics, biology, psychology and other selected sciences, with reference to their presuppositions and general findings. Relations between the sciences and implications of scientific methods for other fields of inquiry. 3 lectures. Prerequisite: Junior standing or a course in philosophy.

Physical Education

PHYSICAL EDUCATION

PE 100 Introduction to Physical Education (2)

Designed to acquaint the student with concept of Physical Education as a profession. 2 lectures.

PE 103 School and Community Health Education (2)

The school health program in relation to community health agencies. Underlying principles, legal aspects, administrative divisions of health instruction, health services and healthful school living. 2 lectures.

PE 107 Health Education (2)

Topics designed to acquaint the student with the major health problems of everyday living. 2 lectures.

PE 126 Community Recreation (3)

The community recreation program. Activities and responsibilities of playground leaders and their supervisors. 1 lecture, 2 two-hour laboratories.

PE 141 Physical Education Activity (½)

Sections are organized in swimming; field and court sports; gymnastics; social, folk and square, and modern dance; body mechanics for women; weight training for men. 2 one-hour periods. Total credit limited to 1½ units.

PE 142 Physical Education Activity (½)

Activity courses to be completed from a series of twelve to be selected by the student's adviser. Courses are open only to Physical Education majors and minors. Total credit limited to 1½ units. 2 one-hour periods.

PE 144 Beginning Swimming (½)

Beginning swimming for students who are unable to swim 100 yards using each of the following strokes: crawl, back, side, and breast. 2 one-hour periods.

PE 145 Senior Life Saving (½)

American Red Cross Life Saving techniques. Course completion cards will be issued to those who successfully pass the course. 2 laboratories. Prerequisite: Demonstrated strong swimming ability.

PE 147 Adaptive Activities (½)

Group and individual exercise based upon individual needs in posture, body mechanics, nutrition, post injury and illness, and cardiac cases. Students take this course in lieu of PE 141 or 241 upon recommendation of the college physician. 2 one-hour periods. Total credit limited to 3 units.

PE 151 Competitive Athletics (½)

May be substituted for required physical education by those qualified to compete in intercollegiate sports program. 10 hours activity. Total credit limited to 1½ units.

PE 201 History and Philosophy of Physical Education (3)

History of physical education including philosophical, institutional, and personal influences. Application of education principles to physical education. 3 lectures.

PE 221 Safety and First Aid (2)

A standard American Red Cross first aid course. Instruction and practice in the immediate and temporary care of injuries and sudden illness. 1 lecture, 1 two-hour laboratory.

PE 224 Administration of Recreation (3)

Supervision and administration of recreation with consideration of facilities, budget, equipment maintenance, public relations, and special activities. 2 lectures, 1 two-hour laboratory.

PE 232 Techniques of Officiating (3)

Techniques of officiating men's sports. 2 lectures, 1 two-hour laboratory.

PE 241 Physical Education Activity (½)

Sections are organized in tennis, golf, badminton, handball, basketball, advanced basketball, volleyball, advanced volleyball, archery, fencing, modern dance, body mechanics, synchronized swimming, advanced swimming. 2 one-hour periods. Total credit limited to 1½ units.

PE 242 Physical Education Activity (½)

Activity courses to be completed from a series of twelve to be selected by the student's adviser. Courses are open only to Physical Education majors and minors. Total credit limited to 1½ units. 2 one-hour periods.

PE 245 Teaching Water Safety (1)

Lifesaving techniques. The Senior Red Cross Life Saving and Water Safety Certificate will be issued to those students who satisfactorily complete this course. 2 one and one-half hour laboratories.

PE 251 Competitive Athletics (½)

May be substituted for required physical education by those qualified to compete in intercollegiate sports program. 10 hours activity. Total credit limited to 1½ units.

PE 255 Apparatus and Gymnastics (2)

A critical analysis of the methods and problems in teaching and coaching apparatus and gymnastics. Application is made to the secondary teaching situation with emphasis on lesson planning, development of teaching units, organization for class activity and administration of the program. 1 lecture, 1 two-hour laboratory.

PE 256 Apparatus and Gymnastics (2)

Theory of teaching and coaching apparatus and gymnastics. Women PE majors and minors. 2 two-hour laboratories. Prerequisite: PE 141 gymnastics.

PE 300 Safety Education (3)

Principles and practices of safety as applied to home, fire, industrial, school, community, and traffic situations. Accident prevention. 3 lectures.

PE 302 Kinesiology (3)

Science of human movement integrating both structural and functional aspects. Anatomy, physiology, and elementary mechanics in relation to movement in sports, work, and the activities of daily living. 2 lectures, 1 two-hour laboratory. Prerequisite: Zoo 337

PE 303 Physiology of Exercise (3)

Application of the knowledge of human physiology to exercise situations. 2 lectures, 1 two-hour laboratory.

PE 311 Swimming and Water Sports—Theory and Practice (2)

Supervision of pool activities. Swimming instruction and safety. Teaching and coaching swimming and water polo. 1 lecture, 1 two-hour laboratory. Prerequisite: Demonstrated swimming ability.

PE 319 Tests and Measurements in Physical Education (3)

Physical tests and measurements of skill, strength, speed, and endurance as a basis for grading and as a measure of progress in activities. 2 lectures, 1 two-hour laboratory.

PE 321 Football Coaching Theory and Practice (2)

Fundamentals and systems of offensive and defensive football. Care and purchase of equipment, supplies and facilities. Rules of the game. 1 lecture, 1 two-hour laboratory.

Physical Education

PE 323 Baseball Coaching Theory and Practice (2)

Fundamentals of baseball with emphasis on strategy, selection of players, officiating, interpretation of rules, scoring, and administration of interschool games. 1 lecture, 1 two-hour laboratory.

PE 324 Team Sports for Women (3)

Organization, curriculum content and design of team sports at the secondary school level. 1 lecture, 2 two-hour laboratories. Prerequisite: PE 142, 242

PE 325 Aquatics and Selected Activities for Women (3)

Organization, curriculum content and design of aquatic and selected activities at the secondary school level. 1 lecture, 2 two-hour laboratories. Prerequisite: PE 142, 242

PE 326 Individual and Dual Sports for Women (3)

Organization, curriculum content and design of individual and dual sports at the secondary school level. 1 lecture, 2 two-hour laboratories. Prerequisite: PE 142, 242

PE 327 Wrestling Coaching Theory and Practice (2)

Coaching techniques of wrestling. Emphasis on skill instruction, dual meet and tournament organization, officiating, interpretation of rules. 1 lecture, 1 two-hour laboratory.

PE 329, 330 Women's Team Sports Officiating (1) (1)

Rules interpretation and officiating of volleyball and basketball. 1 two-hour laboratory.

PE 331 Intramural Sports (3)

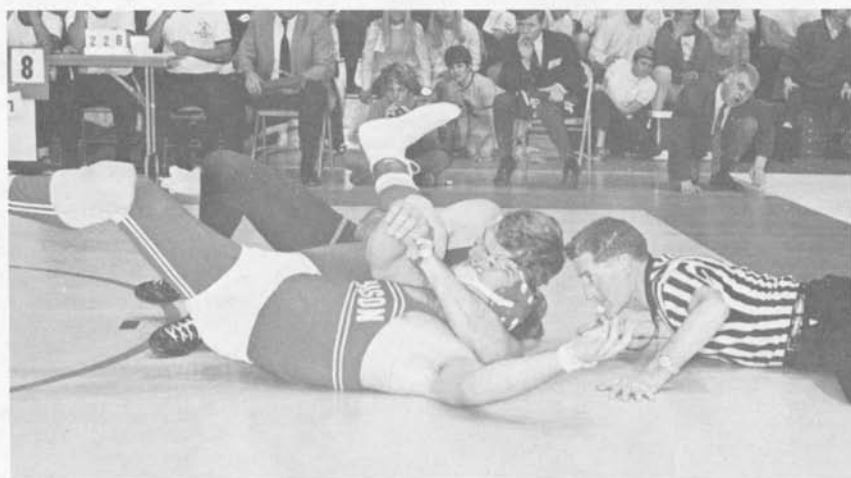
Principles and policies underlying programs of intramural sports in secondary schools and community centers. 2 lectures, 1 two-hour laboratory.

PE 332 Elementary School Physical Education (3)

Prepares the student to guide elementary school age children through a well-balanced program in physical education. Aims, objectives, procedures, methods, evaluation and program planning. 1 lecture, 2 two-hour laboratories.

PE 333 Track and Field Coaching Theory and Practice (2)

Coaching techniques for various track and field events. Problems of team balance; study of rules. 1 lecture, 1 two-hour laboratory.



PE 334 Introduction to Dance (3)

Fundamental problems in dance, including rhythmic analysis and accompaniment for creative dance, singing games, and mixers. Basic principles and activities in a well-rounded program of dance at elementary and secondary level. 1 lecture, 2 two-hour laboratories.

PE 337 Camping and Outdoor Education (3)

Introduction to current status, principles, organization and administration of outdoor education and camping. 2 lectures, 1 two-hour laboratory.

PE 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Senior standing or permission of the instructor.

PE 401 Organization and Administration of Health and Physical Education (3)

Underlying philosophy, principles, policies, and procedures of administration as applied to health and physical education. Legal aspects and the interrelationships with the general school curriculum at the local, state, and national levels. 3 lectures.

PE 405 Administration of School Health Education (2)

Current procedures and practices in the administration of the school health program. Problems analyzed and recommended procedures stressed. 2 lectures.

PE 406 Adaptive Physical Education (3)

Growth and development patterns; their relation to special and regular physical education programs. Analysis of postural divergence and procedures for prevention and correction. 2 lectures, 1 two-hour laboratory. Prerequisite: PE 302, 303

PE 422 Basketball Coaching Theory and Practice (2)

Fundamental individual basketball skills. Theories of offensive and defensive team play. 1 lecture, 1 two-hour laboratory.

PE 432 Athletic Training and Massage (2)

Modern principles and practices in conditioning and care of athletes. Theory and practice in the scientific manipulation of the muscles as related to therapeutic exercise. 2 two-hour laboratories.

PE 440 Physical Education Activity (1)

Required of all physical education majors. Emphasis will be given to class organization of required physical education classes. Total credit limited to 3 units. 2 one-hour periods. Prerequisite: PE 319 and completion of required activity classes.

PE 446, 447, 448 Dance (2) (2) (2)

Theory of teaching social, modern, folk and square dance. 2 two-hour laboratories. Prerequisite: PE 141 or 241, PE 334

PE 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: PE 319

PE 500 Individual Study (1-3)

Advanced study planned and completed under the direction of a member of the department faculty. Open only to graduate students who have demonstrated ability to do independent work. Enrollment by petition. Prerequisite: Consent of department head, graduate adviser, and supervising faculty member.

PE 501 Advanced Adaptive Physical Education (3)

Advanced techniques in the detection of defective body mechanics and establishment of class procedures for prevention and elimination of these defects. 3 lectures.

Physical Education

PE 502 Advanced Seminar in Problems of Physical Education (3)

Practical problems in physical education and their solution in terms of desired objectives in this field. 3 lectures.

PE 506 Physical Education for the Mentally Retarded (2)

Development of concepts and activities for trainable and educable mentally retarded. Contributions of physical education to the growth and development of the mentally retarded as an integral tool in their education and training. 2 lectures. Prerequisite: Graduate standing.

PE 511 Administration of Physical Education (3)

Principles and techniques of administration of physical education on the elementary and secondary school levels. 3 lectures.

PE 512 Advanced Seminar in Health Education (3)

Rules of hygiene; problems of healthful living, and school hygiene. 3 lectures.

PE 513 Evaluation of Current Studies (3)

Analysis and evaluation of published studies in physical education, health education and recreation. 3 lectures.

PE 516 Physical Education Facilities, Equipment and Finance (3)

Design and construction of physical education facilities. Budgeting and financing physical education, intramural, and athletic facilities and programs. 3 lectures. Prerequisite: Graduate standing.

PE 517 Research Methods in Physical Education (3)

Evaluative aspects of physical education; laboratory planning, descriptive methods, anthropometry, body mechanics, methods of instruction, analysis of findings. 3 lectures. Prerequisite: PE 425

PE 521 Curriculum and Methods in Health and Physical Education (3)

Methods, curricular materials, and evaluation procedures in elementary and secondary schools health and physical education. 3 lectures.

PE 522 Mechanical Analysis of Sports (3)

Application of principles of body mechanics to physical education and sports activities as a basis for analyzing and improving motor performance. 3 lectures. Prerequisite: PE 302, 303, consent of instructor

PE 523 Administration of Co-Curricular Activities (3)

The place of co-curricular activities in education. Particular emphasis on purposes, administrative control, management and operational policies of men's and women's programs. 3 lectures.

PE 525 Motor Learning (3)

Analysis of research principles and concepts of motor performance and learning directed toward psychology of teaching and coaching. 3 lectures.

PE 526 Sports in American Life (3)

Analysis of physical education in U.S. culture, socio-cultural variables, changing patterns, current trends, problems and issues. 3 lectures.

PE 530 Advanced Physiology of Exercise (3)

Effects of exercise on human beings in relation to performance and physiological adjustment to activity. 2 lectures, 1 two-hour laboratory. Prerequisite: PE 303

PE 599 Thesis (2) (2) (2)

Independent research under the guidance and supervision of the staff.

PHYSICAL SCIENCE

PSc 101, 102, 103 Structure and Behavior of Matter (4) (4) (4)

Integrated course involving the basic principles of physics and chemistry. A quantitative study of matter and energy and the principles and laws that describe their behavior and applications. Not open for credit to students who have completed a college course with laboratory in physics or chemistry. 3 lectures, 1 recitation. Prerequisite: Math 100, 103, or 117

PSc 521 Curriculum and Methods in the Physical Sciences (3)

Techniques, aims and objectives in the teaching of physics, chemistry, physical science, and general science at the secondary school level. Selection and organization of teaching material. Evaluation of results. 3 lectures. Prerequisite: Graduate standing.

PHYSICS

Phys 100 Introduction to Physics (1)

Introduction to the professional work of the physicist. Content and methods of physics. Orientation to the resources and objectives of the Physics Department. 1 lecture.

Phys 104 Introductory Physics (4)

Fundamental principles of mechanics, heat, light and electricity. Not to be taken by students who have taken a college course in Physics. 4 lectures. Prerequisite: Math 103 or 200 or 117

Phys 121, 122, 123 College Physics (4) (4) (4)

Fundamental principles of mechanics; hydraulics, heat, light and sound; magnetism, electrostatics, current electricity, atomic and nuclear physics. Not open to students who have previously taken corresponding college courses in physics. 3 lectures, 1 laboratory. Prerequisite: Math 103 or 113 or 117 or 200

Phys 131 General Physics (4)

Fundamental principles of mechanics: vectors, particle kinematics, particle dynamics, work and energy, linear momentum, rotational kinematics and dynamics, equilibrium. 3 lectures, 1 laboratory. Prerequisite: Math 141

Phys 132 General Physics (4)

Oscillations, fluid statics and dynamics, waves in elastic media, sound waves, temperature, heat and the first law of thermodynamics, kinetic theory of matter, second law of thermodynamics. 3 lectures, 1 laboratory. Prerequisite: Phys 131

Phys 133 General Physics (4)

Charge and matter, the electric field, Gauss's Law, electric potential, dielectrics, capacitance, current and resistance, electromotive force and circuits, magnetic fields, magnetic field of a moving charge, induced emf, inductance. 3 lectures, 1 laboratory. Prerequisite: Phys 131, Math 142

Phys 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Phys 204 Introduction to Modern Physics (3)

Elementary treatment of relativity, atomic structure, atomic spectra; nuclear radiation and detection; nuclear reactions, radioactivity and nuclear energy. Not open to students with credit in Phys 211. Will not satisfy the Phys 211 requirement. 3 lectures. Prerequisite: Phys 123

Phys 206 Electrical Circuits (3)

Direct current, alternating current, and electronic circuits. 3 lectures. Prerequisite: Phys 133, Math 143

Physics

Phys 207 Electronic Methods in Physics (2)

Operational amplifiers. Digital techniques including multivibrators, counting, logic, and analog/digital converters. Instruments used in modern physics. 2 lectures. Prerequisite: Phys 206 or equivalent.

Phys 211 Introduction to Optics and Atomic Physics (4)

Fundamental principles of optics and atomic physics. Basic geometric optics, optical instruments, introductory physical optics. Introduction to the fundamental particles of matter, interpretation of spectra, relativity, atomic structure. 4 lectures. Prerequisite: Phys 133 or equivalent.

Phys 212 Waves and Vibrations (3)

Introductory treatment of waves. Fourier series. Damped oscillations. Electrical analogs, the wave equation and solutions. 3 lectures. Prerequisite: Phys 133, Math 242. Recommended: Math 319

Phys 213 Introduction to Nuclear Physics (3)

Nuclear radiations and interactions. Detection methods, instruments and radioactive hazards. Nuclear reactions and induced radioactivity. Nuclear energy. 3 lectures. Prerequisite: Phys 211

Phys 223 Physical Optics (4)

The physical nature of light. Reflection, refraction, diffraction, interference, polarization and absorption phenomena. 3 lectures, 1 laboratory. Prerequisite: Phys 211, Math 241

Phys 243 Introductory Nuclear Physics Laboratory (1)

Techniques of measurement including Geiger, proportional and scintillation counting. Properties of alpha, beta and gamma radiation. 1 laboratory. Prerequisite or concurrent: Phys 213, Phys 256 or equivalent.

Phys 256, 257 Electrical Measurements Laboratory (1) (1)

Electrical measurements using direct current, alternating current, and electronic methods. 1 laboratory. Prerequisite or concurrent: Phys 206

Phys 301 Heat (3)

The kinetic theory of gases. Distribution of molecular velocities. Transport phenomena. First and second law of thermodynamics. 3 lectures. Prerequisite: Phys 133, Math 241

Phys 302 Analytic Mechanics (3)

Vector analysis, statics of particles and rigid bodies, uniform and parabolic catenary, laws of motion, kinematics and dynamics of a particle. Work and energy. Particle in uniform field. Oscillatory motion (damped and forced oscillation). Center of mass. Linear and angular momentum. 3 lectures. Prerequisite: Phys 131, Math 242

Phys 303 Analytic Mechanics (3)

Dynamics of a rigid body, central force motion. Three-dimensional motion of a rigid body, wave motion, introduction to Lagrange's and Hamilton's equations. 3 lectures. Prerequisite: Phys 302

Phys 306, 307 Electricity and Magnetism (4) (3)

Electric and magnetic field theory using vector treatment. Electric fields, dielectric materials, magnetic fields, induced emf's and induction, magnetic materials, general field and wave equations, plane electromagnetic waves. 4 lectures, 3 lectures. Prerequisite: Phys 133, Math 304 or 405

Phys 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigations, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

Phys 401 Atomic Physics (3)

Foundations of atomic theory, atomic structure, electron energy levels, X-rays, Introduction to quantum theory and special relativity. Wave-particle duality. 3 lectures. Prerequisite: Phys 211, Math 241

Phys 403 Nuclear Physics (3)

Nuclear reactions. Structure of the nucleus. Nuclear energy levels. Radioactive decay processes. Nuclear fission. Nuclear spin and magnetic moment. Elementary particles. 3 lectures. Prerequisite: Phys 213, 405

Phys 405 Quantum Mechanics (3)

The experimental basis of quantum mechanics. The wave equation and interpretation. Solutions for one dimensional problems and the one electron atom. 3 lectures. Prerequisite: Phys 401; Math 242. Recommended: Math 304

Phys 406 Solid State Physics (3)

Crystalline structure of solids. Vibrational and electronic energies in the crystal lattice. Electrical, thermal, and magnetic properties of metals, insulators, and semiconductors. 3 lectures. Prerequisite: Phys 405

Phys 407 Quantum Mechanics (3)

Interaction of an atom with an external magnetic field. Angular momenta of electrons and atoms. Perturbation theory. Multi-electron atoms. Radiative transitions. 3 lectures. Prerequisite: Phys 405, Math 304

Phys 412 Solid State Physics for Engineers (3)

Basic quantum mechanics and statistics applied to elementary discussion of reciprocal space, free electron model, lattice vibrations, bonding in solids, bulk properties of semiconductors. Applications to electrical, thermal, and magnetic properties of solids. Current topics. Prerequisite: Phys 211, WM 306

Phys 413 Advanced Topics in Solid State Physics (3)

Lattice dynamics, exchange charge model of ionic crystals, band theory, transport phenomena. Properties of superfluids and conductors, current experimental techniques. Review of the present state of the art from journal articles. 3 lectures. Prerequisite: Phys 406, 412, or consent of instructor.

Phys 421 Nuclear Reactor Physics (4)

Nuclear fission. Nuclear chain reaction. Neutron diffusion. Thermal reactor critical equation. Time varying system. Reactor control and factors affecting multiplication. 3 lectures, 1 laboratory. Prerequisite: Phys 243, Math 242

Phys 441 Atomic Physics Laboratory (1)

Experimental studies of the properties of electrons and quanta and their interactions with atoms. Experiments include the determination of electron charge and mass, Planck's constant, atomic energy levels and properties of X-rays. 1 laboratory. Prerequisite: Phys 211

Phys 443 Nuclear Physics Laboratory (1)

Energy spectra of nuclear particles. Coincidence measurements. Absolute activity determinations and selected specialized techniques. 1 laboratory. Prerequisite or concurrent: Phys 403. Prerequisite: Phys 243

Phys 452 Solid State Physics Laboratory for Engineers (1)

Selected experiments on the solid state of matter using electrical, optical, and x-ray methods. 1 laboratory. Prerequisite or concurrent: Phys 412

Phys 456 Solid State Physics Laboratory (1)

Experimental study of the solid state of matter using X-ray, electrical and optical methods. 1 laboratory. Prerequisite or concurrent: Phys 406. Prerequisite: Phys 441 or consent of instructor.

Physics/Political Science

Phys 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

Phys 463 Undergraduate Seminar (2)

Study of current developments in physics and discussion of periodicals of an appropriate level. 2 meetings.

Phys 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

Phys 501 Selected Topics in Advanced Physics (3)

Topics in mathematical physics or advanced experimental work. 3 lectures. Prerequisite: Graduate standing.

Phys 502 Nuclear Physics (3)

Instrumentation, methods, and results of experiments. Systematics and theory of nuclear structure. 3 lectures. Prerequisite: Graduate standing.

POLITICAL SCIENCE

Pol Sc 100 U. S. History and Government (3)

Basic structure and operation of the federal government. The constitution as a modern regulatory instrument; bases of American ideals. Function of state and local government. This course may not be substituted for Hist 204, 205, Pol Sc 201 or 401. 3 lectures. Not open to degree students for degree credit.

Pol Sc 101, 102 National and California Government (3) (3)

Concepts and techniques of political science; Governmental institutions of the United States. California state and local political institutions and problems. Completion of PolSc 101 and 102 will satisfy the California state requirements in the United States Constitution, state and local government. 3 lectures.

Pol Sc 105 Introduction to International Relations (3)

Introduction to dynamics, character and substance of power relations among nations; conflict and accommodation, including the nature of the state and the international community. 3 lectures.

Pol Sc 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Pol Sc 201 American Government (3)

The origin, nature, and distribution of political power. Declaration of Independence. The Constitution of the United States. Function and current problems of national, state and local government. Finding and evaluating authoritative source materials on political affairs. Not open to students with credit in or enrolled in Pol Sc 101. 3 lectures. Prerequisite: Sophomore standing.

Pol Sc 202 Comparative Government (3)

Comparative study of the government of the United Kingdom and other selected Western European countries. 3 lectures. Prerequisite: Pol Sc 101 or 201

Pol Sc 203 Basic Political Analysis (3)

The discipline of political science; its subject matter and fields; introduction to the science of political analysis. 3 lectures. Prerequisite: 9 units of political science.

Pol Sc 302 American Political Process (3)

Political parties, pressure groups, public opinion and the role of each in contributing to the dynamics of the American political process. 3 lectures. Prerequisite: Junior standing and Pol Sc 101 or 201

Pol Sc 306 Modern Political Thought (3)

Theories of political control and the relationship between man and the state. 3 lectures. Prerequisite: Junior standing.

Pol Sc 311 Inter-American Relations (3)

Inter-American affairs. Political, economic, and social problems; forces motivating cultural behavior, industrial development, trade techniques, agriculture methods. Opportunities for employment in agriculture, engineering, and business. Finding and evaluating authoritative source materials on Latin American affairs. 3 lectures. Prerequisite: Pol Sc 201, Hist 204

Pol Sc 312 International Politics (3)

International political processes and problems; foreign policies and politics in relations between states; conflicts and adjustments. Analyses of selected problems. 3 lectures. Prerequisite: Pol Sc 105

Pol Sc 314, 315, 316 Public Administration (3) (3) (3)

Administration of public services; organization and procedures in theory and practice; dynamics of public policy management, politics and administration, responsible bureaucracy. Areas and problems of administrative research; methods of analyzing organizational structures and functions; planning and administration of programs. The ecology of public administration. 3 lectures. Prerequisite: Pol Sc 201 or Pol Sc 101, 102

Pol Sc 321 American Constitutional Law (3)

Basic principles of American constitutional law developed by the case method. Judicial review, separation of powers, federalism, individual rights and duties. 3 lectures. Prerequisite: Pol Sc 101 and 102, or 201

Pol Sc 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

Pol Sc 401 State and Local Government (3)

Structure, function and problems of state, county, and local governments. 3 lectures. Prerequisite: Pol Sc 102 or 201

Pol Sc 402 Politics and Governments of Developing Areas (3)

Institutions and processes of governments in a selected world area experiencing economic and political development. Each time the course is offered it will bear a subtitle descriptive of the particular area studied. 3 lectures. May be repeated to a total of 9 units. Prerequisite: Pol Sc 201 and Hist 205 or equivalent.

Pol Sc 403 Municipal Government (3)

Organization, politics, and problems of contemporary American municipalities. Trends in city life and government. 3 lectures. Prerequisite: Pol Sc 102 or 201

Pol Sc 411 Contemporary U.S. Foreign Policy (3)

The formulation and conduct of U.S. foreign policy. Analysis of the theory and elements of U.S. strategy; diplomacy, propaganda, economic operations, psychological warfare, and military strategies. 3 lectures. Prerequisite: Pol Sc 105

Pol Sc 412 International Organization (3)

Structure, functions, powers of the United Nations, selected regional organization, and specialized agencies. Current problems facing international organizations. 3 lectures. Prerequisite: Pol Sc 105

Pol Sc 418 Contemporary Problems and Institutions of the U.S.S.R. (3)

Study and analysis of political, economic, and social institutions and conditions of the U.S.S.R. 3 lectures. Prerequisite: Junior standing or consent of instructor.

Political Science/Poultry

Pol Sc 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

Pol Sc 463 Undergraduate Seminar (2)

Preparation and presentation of current developments in the field of political science. 2 meetings. Prerequisite: Senior standing.

Pol Sc 465 Contemporary Problems and Institutions of the Middle East and Africa (3)

Study and analysis of political, economic, and social institutions and conditions of the countries of the Middle East and North Africa. 3 lectures. Prerequisite: Junior standing or consent of instructor.

Pol Sc 468 Contemporary Problems and Institutions of Africa South of the Sahara (3)

Study and analysis of indigenous institutions, Western influences, and nationalism in Africa south of the Sahara. Selective area studies illustrative of colonialism and the politics of independence. 3 lectures. Prerequisite: Junior standing or consent of instructor.

Pol Sc 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

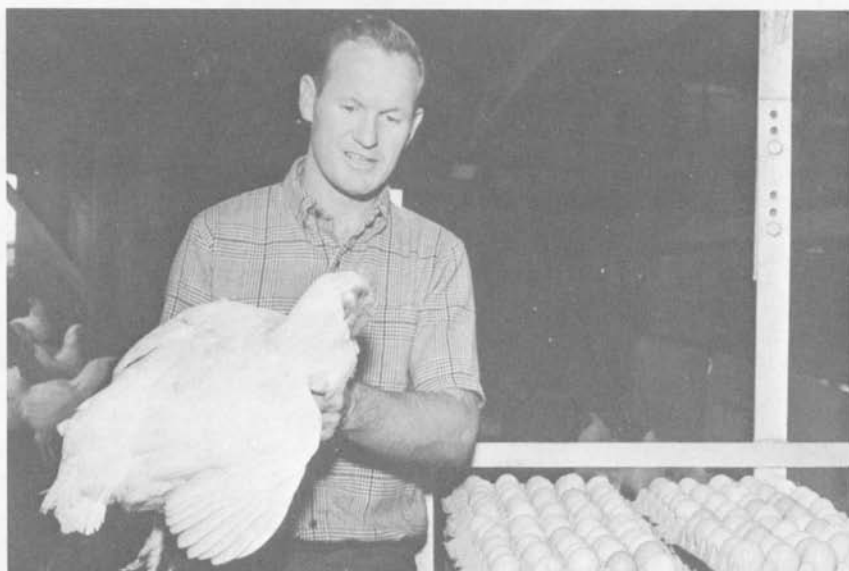
POULTRY INDUSTRY

PI 121 Poultry Industry Development (4)

Scope and importance of the poultry industry as a part of California agriculture. Poultry organizations, publications, employment opportunities. Basic skills in industry organization. 3 lectures, 1 laboratory.

PI 122 Replacement Programs and Broiler Production (4)

Organization and planning of the replacement program on the commercial poultry enterprise. Modern techniques and practices including costs, facilities, and management of the replacement program. 3 lectures, 1 laboratory.



PI 123 Poultry Feeding and Nutrition (4)

Nutritional requirements, feeding principles and modern practices. Formulation of rations for specific purposes and commercial economy practices. Feed industry distributive procedures. 3 lectures, 1 laboratory. Prerequisite: ASci 101

PI 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

PI 221 Poultry Selection and Egg Production (2)

Biological environmental factors that affect quality, size, and number of eggs produced. Techniques and practices of working with the commercial producing flock. 1 lecture, 1 laboratory.

PI 222 Poultry Products, Processing and Marketing (3)

Assembling, processing, distributing and merchandising of poultry meat and eggs. Standardization and regulations applicable to the marketing of poultry products. Development and promotion of consumer products. 2 lectures, 1 laboratory.

PI 223 Poultry Incubation (2)

Embryology fundamentals and metabolism of the developing embryo. Artificial incubation practices as applied in the commercial hatchery. Nutritional, genetic and environmental factors that affect the hatch. 1 lecture, 1 laboratory.

PI 230 General Poultry Production (3)

Survey of the various phases of the modern poultry industry including nutrition, breeding, flock health, production and management. Business aspects of poultry production and marketing of products. Not open to poultry majors. 2 lectures, 1 laboratory.

PI 231 Poultry Anatomy and Physiology (3)

Structural aspects and normal functions of the principal systems of domestic poultry. 2 lectures, 1 laboratory. Prerequisite: Zoo 131 or Bio 100

PI 233 Poultry Plant Design and Equipment (2)

Design and planning a modern commercial poultry operation. The engineering of buildings and equipment to specific commercial functions. Coordination of buildings, equipment and operations designed for maximum plant efficiency. 1 lecture, 1 laboratory.

PI 248 Hatchery Operation (1)

Hatchery practice in care and operation of incubators. Servicing and adjusting the equipment and controlling sanitation. Skills in grading chicks, pedigree banding, and keeping hatchery records. 1 laboratory.

PI 303 Poultry Hygiene and Flock Health (3)

Management, sanitation and vaccinating programs for the maintenance of the flock health. Control and prevention of diseases and parasites. 3 lectures. Prerequisite: Bact 221, PI 231

PI 305 Game Bird Propagation and Management (3)

Game bird anatomy, physiology and nutrition. Health, natural and artificial reproduction, and rearing techniques as practiced in public resource programs and private enterprises. Participation in an organized two-day field trip is required. 3 lectures. Prerequisite: One quarter college mathematics, one quarter animal biology and Chem 121

PI 320 Poultry Consumer Education (2)

Buyer's guide for poultry products. Consumer grade standards of eggs and poultry meat. Surveys of live and market classes of poultry. Testing eggs and egg products. The use of embryos and baby chicks for demonstration and teaching in the classroom. 1 lecture, 1 two-hour activity.

Poultry/Psychology

PI 321 Applied Poultry Breeding (3)

Genetic applications in the development of commercial poultry stocks for specific productive designs. Application of commercial breeding techniques for flock improvement. Analysis of breeding records. 2 lectures, 1 laboratory.

PI 322 Hatchery Business Organization (4)

Organization and management of a commercial hatchery operation. Recruiting and supervising personnel, organizing flow of products and planning the distribution systems. Managing the finance, advertising, public relations, and sales phases of the hatchery organization. 3 lectures, 1 laboratory. Prerequisite: PI 321

PI 402 Advanced Poultry Enterprise Supervision (3)

Coordination and supervision of the modern commercial poultry enterprise. Analysis of operational procedures, efficiency practices, cost and quality control techniques. Interrelationship of business practices to the enterprise success. 3 lectures. Prerequisite: All required freshman and sophomore poultry courses and PI 321

PI 421 Turkey Industry (3)

Coordination and operation of a commercial turkey enterprise. Application of nutritional, breeding, disease control and marketing practices. Planning and supervising the specialized phases of the turkey enterprise. Development of new products and specialized marketing techniques. 2 lectures, 1 laboratory. Prerequisite: PI 123, 231, 321

PI 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

PI 463 Undergraduate Seminar (2)

Preparing and presenting in an organized manner reports on new trends, special problems, research developments related to the poultry industry. Group discussion of industry special problems. 2 meetings.

PI 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

PI 530 Poultry Business Dynamics (3)

For graduate students enrolled in PI 230. Additional application of advanced poultry problems in the student's major field. 2 lectures, 1 laboratory.

PI 581 Graduate Seminar in Poultry (3)

Current trends and characteristics of the poultry industry enterprise. Group discussions of skills, techniques and practices to improve teaching of vocational agriculture as it applies to poultry. 3 meetings.

PSYCHOLOGY

Psy 104 Effective Study Techniques (2)

Designed to acquaint students with basic aims and objectives of going to college, and to provide adequate instruction and practice in specific study skills; effective study methods, note-taking, time-planning, memory, concentration. 1 lecture, 1 quiz section.

Psy 202 General Psychology (3)

Biological individuality; heredity and environment; motives; emotions; sensory activity and its use by the individual; learning and remembering; thinking and creating; intelligence; abilities; personality; culture and the individual; oneself and others. 3 lectures.

Psy 251 Laboratory in Group Activities (1)

Skills and techniques of solving problems in large and small groups; conducting and reporting meetings; analyses of leadership dynamics in campus organizations. 1 two-hour laboratory. Total credit limited to 6 units.

Psy 301 Personality and Mental Health (3)

Factors of mental health; achieving efficiency; personality development; emotional control; social adaptation; improvement of thinking; religion; program for mental health. 3 lectures. Prerequisite: Psy 202

Psy 302 Psychology of Business and Industry (3)

Psychological factors involved in employer-employee relationships, an analysis of the current practices of business and industry relative to personnel procurement, placement, training, conditions of work and productivity, human relations, wages, and job evaluation. 3 lectures. Prerequisite: Psy 202

Psy 304 Physiological Psychology (3)

Relations between behavioral and physiological processes, with emphasis on endocrine and nervous systems, special senses, and physiological processes in motivation, emotion, and learning. 3 lectures. Prerequisite: Psy 202, Zoo 122, or consent of instructor.

Psy 307 Abnormal Psychology (3)

Abnormal behavior of individuals. Dynamics, etiology, symptoms, treatment and prevention of the more severe personality and behavior disorders. Includes the psychoneuroses, psychoses, alcohol and drug addiction, psychosomatic illnesses, and character disorders. 3 lectures. Prerequisite: Psy 202

Psy 311 Human Factors (3)

Human decision-making and problem-solving capabilities and limitations. The visual field and other characteristics of human vision. Information capacity of the senses. Motor performance. Human sensitivities to environmental states and change. 3 lectures. Prerequisite: Psy 202

Psy 401 Social Psychology (3)

Human behavior as a product of interaction and social process, nature of group life in relation to social groupings, social conflict, public opinion, group morale, social controls, leadership. 3 lectures. Prerequisite: Psy 202 or permission of instructor.

Psy 432 Psychological Testing (3)

Principles and procedures of the selection, the administration, scoring, and the interpretation of achievement tests, aptitude tests including scholastic aptitude, interest inventories, and personality inventories. 3 lectures. Prerequisite: 9 units of psychology.

Psy 433 Individual Intelligence Testing (4)

Principles and procedures of individual intelligence testing. Supervised experience in the administration and scoring of individual intelligence tests. 2 lectures. 2 activity periods. Prerequisite: Psy 432

Psy 434 Interpreting Individual Psychological Tests (4)

Administration, scoring, and interpretation of the Stanford-Binet Intelligence Scale and the Wechsler scales. Additional tests and collection of non-test data for meaningful educational diagnoses and recommendations to teachers and parents. 2 lectures, 4 hours supervised field experience minimum. Prerequisite: Psy 433

Psy 435 Testing Exceptional Children (4)

Testing of exceptional children to determine learning difficulties, intelligence, mental and emotional characteristics. Preparation of case studies. Screening children for programs for exceptional children. Techniques for assessing psychological traits of culturally different children. 2 lectures, 4 hours supervised field experience minimum. Prerequisite: Psy 434

Psychology/Social Sciences

Psy 534 Dynamics of Individual Behavior (3)

Integration of the findings from perception, learning, motivation, and social psychology directed toward helping the individual to understand himself and others and utilize this knowledge in his vocation. 3 lectures. Prerequisite: Psy 301

Psy 535 Psychology of Learning (3)

Principles and practices in the field of educational psychology including learning and its variables, general and specific abilities, and measurements as they apply to this area. 3 lectures. Prerequisite: Ed 312

SOCIAL SCIENCES

Soc Sc 101 Introduction to the Social Sciences (3)

The social sciences in their relationship to modern living; an overview of the contributions of social sciences to cultural, social, and economic development. 3 lectures.

Soc Sc 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

Soc Sc 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of the department head.

Soc Sc 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

Soc Sc 463 Undergraduate Seminar (2)

Intensive study of selected social problems with application of techniques for analysis. 2 meetings.

Soc Sc 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

Soc Sc 511 Sources in Social Sciences (3)

Methods of finding and adapting authoritative source materials in the social sciences to the elementary, junior, and senior classroom situation. 3 lectures. Prerequisite: Graduate standing.

Soc Sc 521 Curriculum and Methods in Secondary Social Studies (3)

Content, organization and scope of social studies curriculum in secondary schools, methods of teaching. Evaluation of procedures. 3 meetings. Prerequisite: Major or minor in Social Sciences, admission to teacher education program and graduate standing.

Soc Sc 590 Seminar in Social Sciences (3)

Special problems in selected areas of the Social Sciences. Each seminar will have a subtitle describing its nature and content. 3 lectures. Maximum of 9 units may be earned. Prerequisite: Graduate standing and consent of instructor.

SOCIOLOGY

Soc 105 Introduction to Sociology (3)

Orientation to the nature of the study of society; survey of approaches to social analysis. Emphasis upon primary concepts describing environment, social structure, and social change for increased understanding of human relations. An overview of the systems of social relationships. 3 lectures.

Soc 201, 202, 203 Principles of Sociology (3) (3) (3)

Sources of materials and methods of sociological study; concepts and principles; structure and process of group life; social institutions. Applications of techniques in field study. 3 lectures.

Soc 206 The Sociology of Family Life (3)

Description and analysis of the social relationships within the family group. Examination of alternative solutions to problems which arise in family living. 3 lectures.

Soc 301 Social Welfare in the U.S. (3)

Introduction to the field of social welfare; the development of American social work; scope and diversity of specific programs designed to meet welfare problems in contemporary society. 3 lectures. Prerequisite: 9 hours of sociology or consent of instructor.

Soc 302 Social Work (3)

Development of public welfare services; current problems and policy issues; analysis of current programs of social insurance, public assistance programs; inter-agency relationships. 3 lectures. Prerequisite: Soc 301

Soc 303 Social Problems (3)

An appraisal of various factors from which social problems of the contemporary American society emerge and alternative procedures for dealing with such problems. 3 lectures.

Soc 313 Urban Sociology (3)

Structure of social relationships in the community; physical structure of communities; patterns of community cooperation and conflict; changing patterns of urban community life; social class and political influence on the community level. 3 lectures. Prerequisite: One quarter of sociology or consent of instructor.

Soc 315 Race Relations (3)

Structure of relationships among ethnic and racial groups. Sources of discrimination and prejudice in personality and social structure. Patterns of segregation. Evaluation of current techniques for restructuring intergroup relations. 3 lectures. Prerequisite: 6 hours of sociology or consent of instructor.

Soc 316 American Minorities (3)

Problems in assimilation of the Afro-American, Mexican-American, and American Indian. Analysis of internal group structures and external factors impeding assimilation of these minorities. Dynamics of intergroup relationships. Assessment of current programs aimed at assimilation. 3 lectures. Prerequisite: Six units of Sociology or consent of instructor.

Soc 323 Social Stratification (3)

Social class and the distribution of status and power in society, with emphasis on contemporary United States; social mobility; relationships of stratification to mental illness, race, family systems, crime and delinquency, etc. 3 lectures. Prerequisite: 6 hours of sociology or consent of instructor.

Soc 344 Sociology of Poverty (3)

Variable indications of poverty in modern society. Chief features of the subculture of the poor. Analysis of different explanations for the persistence of poverty. Survey of proposals for reducing poverty. 3 lectures. Prerequisite: College course in sociology or consent of instructor.

Sociology/Soil Science

Soc 402 Crime and Delinquency (3)

Theories of delinquent and criminal behavior; analysis of institutional and other approaches to rehabilitation of criminals and delinquents. 3 lectures. Prerequisite: Two courses in sociology or consent of instructor.

Soc 413 Methods of Social Work (3)

Theories, concepts, values stressed in social work. Social casework. Principles and practices used by social workers serving individuals and families in correctional, public assistance, medical, psychiatric youth services, and other settings. Discussion of case material and available literature. 3 lectures. Prerequisite: Soc 302

SOIL SCIENCE

SS 121 Soils (4)

Physical, chemical, and biological properties of soils as related to agriculture. 3 lectures, 1 laboratory.

SS 122 Soil Management (4)

Effect of tillage, manuring, drainage, and irrigation practices on soil productivity. 3 lectures, 1 laboratory. Prerequisite: SS 121

SS 123 Soil Materials (3)

Origin, composition, and identification of rocks, minerals, and other materials important in the development of soils. Land forms as related to the nature and properties of soils. 2 lectures, 1 laboratory. Prerequisite: SS 121

SS 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

SS 202 Soil Conservation (3)

Climate, topography, soils and land use in relation to soil and water losses. Evaluation of soil and water conservation programs and practices. 3 lectures. Prerequisite: SS 121 or consent of instructor.

SS 221 Fertilizers (4)

Composition, value, and use of fertilizer materials and soil correctives. Methods employed in the manufacture, distribution, and application of fertilizers. 3 lectures, 1 laboratory. Prerequisite: SS 121

SS 230 General Soils (3)

Properties of soils, management and conservation practices required for the utilization of soil as a natural resource to produce food and fiber. For students outside the field of soil science. Not open to students with credit in SS 121. 3 lectures.

SS 321 Soil Classification (4)

Systems used in soil and land classification. Methods employed in soil surveying. Mapping of assigned areas and the preparation of survey reports. 3 lectures, 1 laboratory. Prerequisite: SS 122

SS 322 Soil Fertility (3)

Plant nutrient requirements of crops. Effect of soil and climatic conditions on the availability of nutrients in the soil. Diagnostic techniques in soils and crops. 2 lectures, 1 laboratory. Prerequisite: SS 122, 221, Chem 122

SS 332 Conservation Techniques (3)

Basic development of subject matter, materials, and activities for classroom instruction in soils, water, range, woodland, and recreation resources. 2 lectures, 1 laboratory.

SS 333 Tropical Soils (4)

Nature and properties of tropical soils, their origin, morphology, classification, fertility, utilization, and conservation. 3 lectures, 1 laboratory.

SS 422 Soil Microbiology (3)

Biochemical activities of soil organisms. Effect of soil organisms on the formation, characteristics, and productivity of soils. Methods of studying soil organisms. 2 lectures, 1 laboratory. Prerequisite: SS 122, 221, Bact 221 or consent of instructor.

SS 423 Soil Chemistry (3)

Fundamental concepts and practices in soil chemistry. Methods of analysis and interpretation of significant investigations for the management of soils. 2 lectures, 1 laboratory. Prerequisite: SS 322 or consent of instructor.

SS 432 Soil Physics (4)

Advanced study of the physical properties of soils. Application of physical-chemical soil relationships to farming and engineering practices. 2 lectures, 2 laboratories. Prerequisite: SS 122, Phys 104, Chem 122, or consent of instructor.

SS 433 Land Use Planning (3)

Evaluation of land use capabilities. Development of plans and practices for the management of crop, range, and forest land. 2 lectures, 1 laboratory. Prerequisite: SS 321

SS 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

SS 463 Undergraduate Seminar (2)

Review of current research, experiments, and problems related to the students' major field of interest. Preparation and presentation of reports on problems or research activities. 2 lectures.

SS 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.

SS 508 Conservation Legislation (3)

Legislation enabling and implementing conservation programs. Legal responsibilities of individuals and groups in the development of natural resources. Proposed or needed legislation for more effective conservation. 3 lectures. Prerequisite: Senior or graduate standing.

SS 521 Soil Morphology (3)

Advanced study of the morphological characteristics of soils. New techniques used in modern systems of soil classification and mapping. 2 lectures, 1 laboratory. Prerequisite: Graduate standing, SS 202, 321, 433

SS 581 Graduate Seminar in Soils (3)

A review of current research, experiments and problems related to soil science. Development of special demonstration and field plot trials for educational groups. 3 lectures.

SS 582 Graduate Seminar in Land Management (3)

Development of plans and practices for the management of crop, range, and wood land. 2 lectures, 1 laboratory. Prerequisite: Graduate standing, NRM 223, SS 433, Cr Sc 411

SS 599 Thesis or Internship (3) (3) (3)

Problems and topics in advanced soil conservation according to interests and needs of the students enrolled. Prerequisite: Graduate standing in soil conservation.

SPANISH

Span 101, 102, 103 Elementary Spanish (4) (4) (4)

For beginners. Class practice in pronunciation, sentence structure, reading, writing, and basic conversation. Laboratory drill with recorded materials. 3 lectures, 1 two-hour laboratory.

Span 201, 202, 203 Intermediate Spanish (3) (3) (3)

Further practice in speaking, reading, and writing Spanish. Introduction to Spanish and Latin American cultures. 3 lectures. Prerequisite: Span 103 or equivalent.

Span 301, 302, 303 Third Year Spanish (3) (3) (3)

Readings in Spanish literature; poetry, essays, novels, plays. 3 lectures. Prerequisite: Span 203 or equivalent.

SPEECH

Sp 111 Professional Fields of Speech (1)

Occupational opportunities, professional organizations, and important journals in the various fields of speech. Development and trends in forensics, discussion, theater arts, and speech correction. 1 lecture.

Sp 200 Principles of Speech (3)

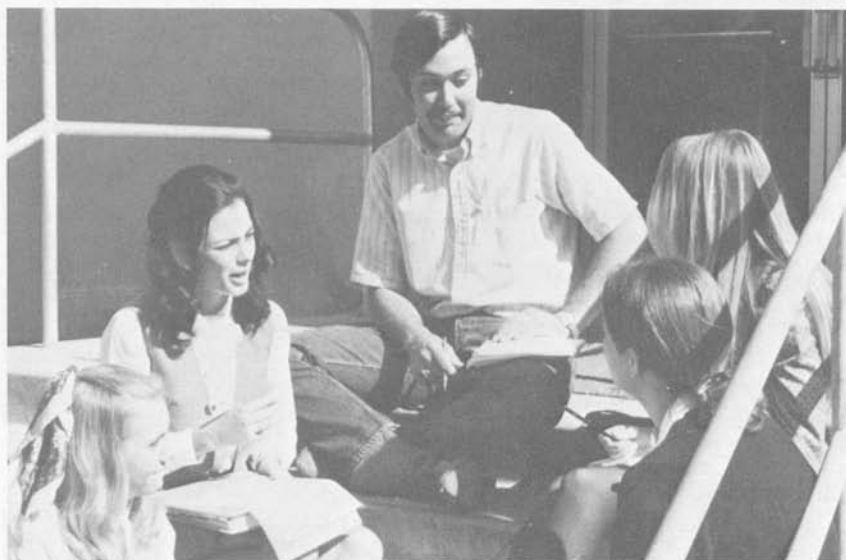
Introduction to the fundamentals and principles which underlie effective speaking. Practical experience in presenting speeches before an audience. A student may not receive credit for both Sp 200 and Sp 201. 3 lectures.

Sp 201 Public Speaking (2)

Training in giving speeches before audiences. Experience in practical speaking situations. 1 lecture, 1 two-hour laboratory.

Sp 202 Advanced Public Speaking (2)

Practice in the composition and delivery of various types of speeches. Emphasis on speeches related to the student's vocational objective. 1 lecture, 1 two-hour laboratory. Prerequisite: Sp 200 or 201



Sp 215 Introduction to Debate (3)

Analysis of evidence and reasoning. Preparation and delivery of speeches based on logical proof. Practice in refutation. 3 lectures. Prerequisite: Sp 200 or Sp 201, or consent of instructor.

Sp 217 Essentials of Discussion (3)

Basic principles and techniques of discussion. Survey of the importance of discussion in contemporary society, including a study of and practice in informal group discussion, panel discussion, symposium, and forum. 3 lectures. Prerequisite: Sp 200 or Sp 201

Sp 300 Forensic Activity (1)

Participation in intercollegiate forensic activities. Any student who expects to participate in such activities during the quarter should enroll. Specific assignments will be determined by instructor. May be repeated to 6 units.

Sp 301 Argumentation and Debate (3)

Techniques of argumentation and their application to debate; logic and reasoning; fallacies of reasoning; experience in various forms of formal argument, including intercollegiate debate; judging and debate program administration. 3 lectures. Prerequisite: Sp 202 or Sp 215

Sp 302 Introduction to Speech Correction (3)

Survey of speech disorders emphasizing causes, symptoms, and treatment of functional defects; preparation of records and case studies; role of the speech therapist in the community and in public schools; role of the public school teacher in speech improvement. 3 lectures.

Sp 304 Persuasion (3)

Basic theory of persuasive speaking; methods of attention, suggestion, motivation and adaptation as applied to speechmaking for the influencing of group opinion and action; emphasis on logical, emotional and ethical processes; presentation of speeches using persuasive methods. 3 lectures. Prerequisite: Sp 202 or Sp 215

Sp 305 Oral Interpretation (3)

Basic theory of interpretation; selection, preparation, and presentation of material for oral reading. 3 lectures. Prerequisite: Sp 200 or Sp 201

Sp 306 Voice and Phonetics (3)

Physiological and anatomical bases of normal voice production. Phonetics as a basis of correct sound formation and standards of pronunciation. Concentration on special skills of enunciation, articulation, and voice improvement. 3 lectures.

Sp 308 Industrial and Professional Speech (3)

Speech in industrial, professional, and informal business including interviews, sales talks, and conference speaking. 3 lectures. Prerequisite: Sp 200 or Sp 201

Sp 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Consent of instructor.

Sp 401 Clinical Methods in Speech Correction (3)

Current procedures and rationales in the management of speech disorders. Familiarization with instrumentation, testing, and methodology. 2 lectures, 1 two-hour laboratory. Prerequisite: Sp 302

Sp 402 Introduction to Audiology (3)

Anatomy and physiology of the hearing mechanism. The hearing process. Familiarization with differing types of hearing disorders. Instrumentation and testing. Methods of rehabilitation. 3 lectures. Prerequisite: Sp 302

Speech/Statistics and Probability

Sp 403 Discussion and Conference Leadership (2)

Relationship of discussion to the democratic processes, critical thinking and the role of leadership in the group process, participation in business and industrial conferences and discussion forums. 2 lectures. Prerequisite: Sp 202 or Sp 217

Sp 405 Advanced Oral Interpretation (3)

Techniques of oral interpretation for special literary forms, interpretation in relation to acting, story interpretation as related to teaching techniques, reading of speech manuscripts. 3 lectures. Prerequisite: Sp 305

Sp 407, 408, 409 History and Criticism of Public Address (3) (3) (3)

Selected speakers and speeches from the ancient Greeks to modern times. Historical survey and evaluation of great speakers and speeches as they pertain to the development of British and American institutions. 3 lectures. Prerequisite: Sp 304, or consent of instructor.

Sp 410 Biblical Reference in Speechmaking (3)

Study of the Bible for understanding of Biblical references used in great speeches, oral presentation of literary passages for appreciation of quotable material. Methods used in speeches contained in the Bible. 3 lectures.

Sp 461 Senior Project (2)

Selection and completion of a project under faculty supervision. Projects typify problems which a graduate may face in his field of employment. Project results are presented in a formal written report. Minimum 60 hours total time.

Sp 463 Undergraduate Seminar (2)

Discussion of individual projects, oral reports on material in current professional writings. 2 lectures. Prerequisite: Senior standing.

Sp 511 Rhetorical Theory (3)

Analytical survey of the major contributions of rhetorical authorities; the application of these contributions to current public speaking. 3 lectures.

Sp 521 Curriculum and Methods in Speech (3)

Curricula, methods, and procedures that may be used effectively in teaching speech classes and directing speech activities in secondary schools. Selection and organization of teaching material. 3 lectures. Prerequisite: Admission to teacher education program and graduate status.

Sp 590 Seminar in Speech (1-3)

Readings and papers on special problems in selected areas of speech. Total credit limited to 6 units. 1-3 lectures. Prerequisite: Graduate status.

STATISTICS AND PROBABILITY

Stat 211 Elementary Probability and Statistics (3)

Classification of statistical data; calculation and uses of various averages; measures of variability; permutations, combinations, and elementary probability; binomial and normal distributions; random sampling, confidence limits. 3 lectures. Prerequisite: 3 units of college mathematics.

Stat 212 Statistical Methods (3)

Tests of hypotheses, confidence intervals, nonparametric methods; linear regression and correlation; chi-square and F-distributions; index numbers; time series; analysis of variance. 3 lectures. Prerequisite: Stat 211

Stat 313 Analysis of Variance (3)

Applications of statistics for students not majoring in statistics or mathematics. Analysis of variance including the one-way classification, randomized blocks, latin squares, and factorial designs. Introduction to analysis of covariance. 3 lectures. Prerequisite: Stat 212

Stat 321 Mathematics of Statistics (3)

Probability, permutations and combinations, discrete and continuous random variables, hypergeometric and binomial frequency functions, frequency distributions, mean, variance, and standard deviation, moments, median and percentiles, the normal distribution, bivariate distributions. 3 lectures. Prerequisite: Math 132 or 142

Stat 322 Mathematics of Statistics (3)

Continuation of Stat 321. Concept of statistical inference, tests of hypotheses, confidence intervals, Student's t-distribution, chi-square distribution, F-distribution, Poisson distribution, bivariate normal distribution. 3 lectures. Prerequisite: Stat 321

Stat 323 Mathematics of Statistics (3)

Continuation of Stat 322. Linear regression and correlation; least squares; analysis of variance including the one-way classification, randomized blocks, latin squares, factorial designs, and multiple comparisons of population means; analysis of covariance. 3 lectures. Prerequisite: Stat 322

Stat 330 Statistical Uses of Computers (3)

Techniques available to the statistician for efficient use of a digital computer to perform statistical computations and to handle large amounts of data. Use of special languages. Analysis of library programs. 3 lectures. Prerequisite: Stat 323, CSc 101

Stat 421 Sampling Theory (3)

Planning, execution, and analysis of sampling from finite populations. Simple, stratified, multi-stage and systematic sampling. Nonsampling errors. 3 lectures. Prerequisite: Stat 322

Stat 425 Probability Theory and Applications I (3)

Basic probability theory, conditional and marginal probability, stochastic independence, probability models for random phenomena, distribution functions, expectation of a function with respect to a probability function. 3 lectures. Prerequisite: Stat 322

Stat 426 Probability Theory and Applications II (3)

Binomial, Poisson, geometric, negative-binomial, normal, beta and gamma probability functions, transformations. Probability functions of sums of independent random variables. Characteristic functions. Stochastic processes. 3 lectures. Prerequisite: Stat 425

Stat 511 Elementary Probability and Statistics (3)

For graduate students. Lectures same as Stat 211. Applications of statistics in the student's major field. 3 lectures.

Stat 512 Statistical Methods (3)

For graduate students. Lectures same as Stat 212. Applications of statistics in the student's major field. 3 lectures. Prerequisite: Stat 511

Stat 513 Analysis of Variance (3)

For graduate students. Lectures same as Stat 313. Applications of statistics in the student's major field. 3 lectures. Prerequisite: Stat 212 or 512

Stat 527 Theory and Applications of Statistics (3)

Discrete and continuous random variables, expected values and moments, moment generating functions, multivariate distributions, sampling, sampling distributions, interval estimation, tests of hypotheses. 3 lectures. Prerequisite: Stat 322

Statistics/Transportation Engineering

Stat 528 Theory and Applications of Statistics (3)

Multivariate normal distribution, sampling distributions, interval estimation, tests of hypotheses, regression and linear hypotheses, experimental design models, and non-parametric methods. 3 lectures. Prerequisite: Stat 527

Stat 540 Foundations in Statistics (3)

Intensive foundation course for the MBA program. Selected elements of descriptive, analytical, and inferential statistics to provide tools for research and decision making in business and economics. 3 lectures. Prerequisite: Graduate standing.

TRANSPORTATION ENGINEERING

TE 321 Introduction to Traffic Problems and Transportation (4)

Elements of ground and water traffic circulation and planning. Driver and vehicle performance. Traffic analysis and control. Planning of air, water and ground transportation units and terminals as elements of complete transportation systems. 3 lecture-discussions, 1 laboratory. Prerequisite: IE 304, Stat 322

TE 329 Transportation Materials (2)

Experimental determination of mechanical properties of concrete, asphalt, and soils as required for engineering applications. Experimental verification of assumptions made in mechanics of materials procedures. Use of strain measuring devices. Preparation of technical reports. 2 laboratories. Prerequisite: Arch 421, Aero 207, 229

TE 421 Highway & Airfield Pavement Design (4)

Theories, principles, and procedures in the structural design of highway and airfield pavements. Design of rigid and flexible pavements. Construction and maintenance procedures for pavements and stabilized bases. 3 lecture-discussions, 1 laboratory. Prerequisite: TE 329

TE 422 Geometric Design of Highways (4)

Location and safe geometric design of highway and other transportation facilities. Earthwork and drainage related to highway, railway, dock, and airport design. Theory and practice in design of alignments, highway cross-sections, intersections, interchanges, and freeways in urban and rural areas. 3 lecture-discussions, 1 laboratory. Prerequisite: TE 321, 329



TE 423 Structural Steel Design (4)

Design and behavior of the elements of steel structures. Proportioning of members and connections. Introduction to plastic design. 2 lecture-discussions, 2 laboratories. Prerequisite: Arch 404, TE 329. Concurrent: ME 349

TE 433 Transportation Systems Planning (4)

Planning of urban and statewide transportation systems. Air, water, rail, highway, and pipeline systems separately and in combination. Selection of routes and types of systems based on economic, social, technological, and other characteristics. Planning of terminals for all types of transportation systems. 3 lecture-discussions, 1 laboratory. Prerequisite: CRP 211, IE 403, TE 321, Ec 212

TE 461, 462 Senior Project (2) (2)

Selection and completion of a project which is typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time. Prerequisite: TE 421, 422

TE 463 Undergraduate Seminar (2)

New developments, policies, practices, and procedures discussed in seminar sessions. Each individual is responsible for the development and effective presentation of topics in his area of emphasis. 2 meetings. Prerequisite: Senior standing.

VEGETABLE SCIENCE

Vg Sc 230 General Vegetable Crops (4)

Principles involved in production, harvesting, packaging, and marketing of major California vegetable crops. Survey of the vegetable industry for other than crop science majors. 3 lectures, 1 laboratory.

Vg Sc 232 Vegetable Crops Production (4)

Production, adaptation, utilization of vegetable crops such as cole crops, beans, celery, peppers, squash, melons, cucumbers, lettuce, carrots, spinach, sweet potatoes. 3 lectures, 1 laboratory. Prerequisite: Cr Sc 131



Vegetable Science/Veterinary Science

Vg Sc 324 Harvesting, Packaging and Marketing Vegetable Crops (4)

Harvesting methods and procedures; current handling and packaging techniques; containers; storage; and grades, grading and laboratory tests for fresh market vegetables. 3 lectures, 1 laboratory. Prerequisite: Vg Sc 232

Vg Sc 326 Vegetables for Processing (4)

Production principles and methods; cultural and harvesting practices as applied to vegetable crops grown primarily for processing. Emphasis will be on planting schedules, field sampling, maturity tests, and forecasting crop maturity. 3 lectures, 1 laboratory. Prerequisite: Cr Sc 131, 133 or Vg Sc 230

Vg Sc 424 Vegetable Crop Management (4)

Organization, management, and operation of commercial size vegetable production acreages; advanced work in production, harvesting, marketing operations, and the varied aspects of the entire commercial vegetable production industry. 3 lectures, 1 laboratory. Prerequisite: Cr Sc 131, 133 or Vg Sc 232

Vg Sc 521 Advanced Vegetable Production (4)

Advanced techniques in commercial vegetable production and management. Skills, cultural practices, and equipment necessary for the mechanization of vegetable production. Present trends in the vegetable industry. 3 lectures, 1 laboratory. Prerequisite: Permission of instructor.

VETERINARY SCIENCE

VS 100 Principles of Veterinary Science (5)

Structural aspects and functions of the principal systems of farm animals, control and prevention of common diseases causing economic losses in livestock. 4 lectures, 1 laboratory. To be taken by technical students only, in substitution for VS 123, 202 and 203. Not open to degree students for degree credit. Prerequisite: Bio 100 or 101

VS 123 Anatomy and Physiology (3)

Structural aspects and the normal functions of the principal systems of the various farm animals. 2 lectures, 1 laboratory. Prerequisite: Zoo 131, 132

VS 203 Animal Parasitology (3)

Identification, life cycles, prevention and control of the common external and internal parasites causing economic loss in livestock. 3 lectures. Prerequisite: Zoo 131, 132

VS 302 Animal Hygiene (3)

Basic disease concepts, transmission of infectious diseases, fundamentals of immunology. Infectious disease preventive principles. The livestock producer's role and responsibilities in governmental farm animal disease control programs. 3 lectures. Prerequisite: Bact 221

VS 310 Zoonosis (2)

A study of some of the common diseases of domestic animals and birds which can be transmitted to man. 2 lectures. Prerequisite: Zoo 131, Bact 221

VS 522 Seminar in Disease Problems (2)

Farm livestock disease problems related to the specific countries of Latin America, Africa, Middle East and Asia. Familiarization with governmental control, prevention and eradication programs for the common and principal diseases unique to individual countries; also familiarization with special testing procedures in various governmental programs. 2 lectures. Prerequisite: VS 202

WELDING AND METALLURGICAL ENGINEERING

WM 121 Introduction to Metallurgical Engineering (3)

Nature and identification of metals and non-metals, production, joining and working processes. Selection for specific purposes. Macro and micro etching and preparation of metallographic specimens. Metallurgical engineering reports, calculations associated with engineering. 2 lectures, 1 laboratory.

WM 141 Manufacturing Processes (1)

Theory, practice, and application of metal joining processes including oxyacetylene, resistance, tungsten-inert-gas, metallic-inert-gas, aluminum brazing and silver alloy brazing. Mechanical tests of welded joints and related reports. 1 laboratory.

WM 142 Manufacturing Processes (1)

Theory and practice in metal cutting and arc welding processes. Electrode manufacture, classification, and application. Welded joint design. Introduction to codes, testing, joint strength. Mechanical tests of welded joints and related reports. Application of process to industrial uses. 1 laboratory.

WM 144 Manufacturing Processes (2)

A combination of WM 141 and WM 142. Allows the student to complete two units of manufacturing processes, welding in one quarter. 2 laboratories.

WM 151 Miniature Bonding (1)

Fundamentals of tungsten inert gas welding, plasma welding, brazing, low temperature soldering, adhesives, and thermal-free joining processes of miniature electronic component assemblies. Joint design. Application of principles for selection of flux for specific bonding processes. 1 laboratory. Prerequisite: WM 141

WM 155 Fundamentals of Metallic Arc Welding (1)

Shielded metallic arc welding including vertical position. Expansion, contraction, distortion, and residual stresses as applied to welded structures. Various joint types including lap, fillets, and butt joints. 1 laboratory. Prerequisite: WM 142

WM 156 Fundamentals of Metallic Arc Welding (1)

Shielded metallic arc welding of steel plates. Includes butt welding, backing materials, hard surfacing, and cast iron welding. Basic weld tests. Welding of light-gauge steel. 1 laboratory. Prerequisite: WM 155

WM 200 Special Problems for Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter. Prerequisite: Permission of department head.

WM 222 Physical Metallurgy (4)

Lattice structures, cooling curves, alloy systems. Mechanical test methods, strength, ductility, modules of elasticity. Heat treatment, isothermal transformation diagrams, complex alloy systems. Application of principles for selection of metals for corrosion resistance. Other engineering materials, including ceramics. 3 lectures. 1 laboratory.

WM 235 Metallurgy for Engineering Technology (4)

Physical and mechanical properties of metallic parts. Selection, heat treatment, and use of metals and alloys. Steel, cast iron, stainless steel, and non-ferrous alloys. Fabrication problems and their solution. 3 lectures, 1 laboratory. Prerequisite: Junior standing in Engineering Technology.

WM 240 Additional Metallurgy Laboratory (1-2)

Total credit limited to 4 units, with not more than 2 units in any one quarter. 1 or 2 laboratories.

WM 251, 252 Materials Acceptance Methods (1) (1)

Nondestructive testing, theory and techniques, including industrial X-ray, ultrasonic, and dye penetrants. Metals processing techniques, joining, working and testing. 1 laboratory.

Welding-Metallurgy

WM 254 Elements of Welded Structures (2)

Cost estimating of steel fabrications. Basic strength of materials as related to machinery structural sections. Strength of welded joints. Design of fabricated machinery. Principally for Agricultural majors. 1 lecture, 1 laboratory. Prerequisite: WM 156

WM 301, 302, 303 Theory of Materials (4) (4) (4)

Fundamentals of material science; concepts and problems relating structure of metals to their behavior in use. Uniaxial and complex static stresses; effects of temperature and rate of loading; elastic and plastic deformation; electrical, magnetic, and thermal behavior; fatigue and creep. 3 lectures, 1 laboratory. Prerequisite: Math 241, Phys 133, ME 211, Chem 125; Engr 251, or consent of instructor.

WM 306 Materials Engineering (3)

Structure of matter. Physical and mechanical properties of materials including metals, alloys, ceramics, insulating materials, semi conductors, polymers and glass. Equilibrium diagrams. Heat treatments, corrosion and protective coatings. 3 lectures. Prerequisite: Sophomore standing in major, Physics 132, Chem 124 or instructor's permission.

WM 309 Survey of Corrosion (2)

Principles of corrosion control, the eight forms of corrosion, materials testing, compatibility, role of metallic structure, environment and surface conditions, protective coatings, economics of corrosion, field trips to corrosion laboratories. 2 lectures. Prerequisite: Junior standing, Chem 122 or 125, Phys 133

WM 324, 325, 326 Metallurgical Engineering (3) (3) (3)

Theory and application of castings to metal product manufacturing. Casting, heat treatment, and metallurgy of welding. Ferrous and nonferrous alloys. Atmospheres, bright annealing, brazing, carbon restoration. Failure investigation. Application of non-destructive testing, X-ray, magnetic particle, ultrasonic, eddy current techniques. 1 lecture, 2 laboratories. Prerequisite: WM 222

WM 341 Materials Engineering Laboratory (1)

Laboratory experiments with materials. Heat treating, steel and aluminum identification of microstructure and physical and mechanical evaluation. 1 laboratory. Prerequisite or concurrent: WM 306

WM 359 Advanced Welding (1)

The application of the inert-gas shielded arc welding process to the hard-to-weld metals, including aluminum and stainless steel, and titanium. Argon and helium as gas shields. 1 laboratory. Prerequisite: WM 141, 142

WM 400 Special Problems for Advanced Undergraduates (1-2)

Individual investigation, research, studies, or surveys of selected problems. Total credit limited to 4 units, with a maximum of 2 units per quarter.

WM 414 Materials for Electronic Engineering (3)

Advanced topics concerning the physical properties of electronic materials and electronic structure, semi conductors, dielectrics, ferromagnetics, processing and fabrication, relation of properties to structures. Prerequisite: WM 306, Phys 406 or 412

WM 421, 422, 423 Advanced Theory of Materials (4) (4) (4)

X-ray diffraction, theory of alloying, imperfections and dislocations, strengthening mechanisms, plastic deformation, strain-hardening, recovery and recrystallization, diffusion, solidification, fracture, creep, fatigue. Metallurgical reactions, thermodynamics of solids, physical chemistry of corrosion gas-metal interactions, corrosion control, polymers, ceramics, cermets. 4 lectures. Prerequisite: WM 303, 326, Chem 306

Welding-Metallurgy

WM 424, 425, 426 Applied Metallurgical Engineering (4) (4) (4)

Tool and complex alloy steels, advanced metallography and photomicrography, investigation of actual service failures, creep, fatigue, corrosion, metallurgical computations, preparation of formal engineering reports. 2 lectures, 2 laboratories. Prerequisite: WM 303, 326; Chem 306

WM 434 Welding Engineering (3)

Weldability of steels and alloys and other metallurgical aspects of welded fabrication. 1 lecture, 2 laboratories. Prerequisite: WM 306

WM 435 Welding Engineering (3)

Pressure vessel design and other design problems in accordance with governing codes. Cost estimating of steel fabrication. Jig and fixture design for mass production with various welding processes. 1 lecture, 2 laboratories. Prerequisite: WM 434

WM 436 Welding Engineering (3)

Problems in quality control. Process selection and evaluation for high speed production. Process procedure qualification. 1 lecture, 2 laboratories. Prerequisite: WM 435

WM 461, 462 Senior Project (2) (2)

Selection and completion of a project under faculty supervision. Projects typical of problems which graduates must solve in their fields of employment. Project results are presented in a formal report. Minimum 120 hours total time.

WM 463 Undergraduate Seminar (2)

Preparation, oral presentation, and discussion by students of technical papers on recent engineering developments. 2 lectures. Prerequisite: Senior standing.

WM 470 Selected Advanced Topics (1-3)

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. Class schedule will list topic selected. Total credit limited to 6 units. 1 to 3 lectures. Prerequisite: Consent of instructor.



Zoology

ZOOLOGY

Zoo 131 General Zoology (4)

Cells, tissues, and organ systems of vertebrates; emphasis on man and domestic animals. 2 lectures, 2 laboratories.

Zoo 132 General Zoology (4)

Embryology, genetics, taxonomy, economic zoology, ecology and evolution. 2 lectures, 2 laboratories. Prerequisite: Zoo 131

Zoo 133 General Zoology (4)

The variety, structure and distribution of animals. 2 lectures, 2 laboratories. Prerequisite: Zoo 132

Zoo 303 Vertebrate Embryology (3)

The developmental processes from the egg to the formation of the body and the establishment of the principal organs and systems. 3 lectures. Prerequisite: Zoo 132

Zoo 321 Mammalogy (4)

Identification, life histories, and economic importance of mammals, with special reference to California species. 2 lectures, 2 laboratories. Prerequisite: Zoo 132 or Bio 129

Zoo 322 Biology of Fishes (4)

Identification, physiology, anatomy, and behavior of marine and freshwater fishes with special reference to local and economically important species. 2 lectures, 2 laboratories. Prerequisite: Zoo 132

Zoo 323 Ornithology (4)

Classification, anatomy and physiology, ecology and behavior, and economic importance of birds. 2 lectures, 2 laboratories. Prerequisite: Zoo 132 or Bio 129

Zoo 326 Comparative Anatomy of the Vertebrates (5)

Comparative structure of vertebrate organ systems. 3 lectures, 2 laboratories. Prerequisite Zoo 132. Recommended: Zoo 303 and Zoo 353

Zoo 329 Vertebrate Field Zoology (4)

Identification and natural history of terrestrial vertebrates, with emphasis on field study of local forms. 2 lectures, 2 laboratories. Prerequisite: Zoo 132 or Bio 129

Zoo 336 Invertebrate Zoology (4)

Study of invertebrate groups of animals with emphasis on taxonomy, morphology, distribution and economic importance. 2 lectures, 2 laboratories, and field work. Prerequisite: Zoo 133 or Bio 129

Zoo 337, 338, 339 Human Anatomy and Physiology (3) (3) (3)

Morphology of man, with laboratory dissection of the cat. Functions of the various organ systems of man with appropriate laboratory experiments. Zoo 337 not open for credit to students who have completed Zoo 326, Comparative Anatomy. 2 lectures, 1 laboratory. Prerequisite: Zoo 132, elementary chemistry.

Zoo 341 Herpetology (4)

Living and extinct reptiles and amphibians; an adaptive approach to their diversity, biology, and classification. 2 lectures, 2 laboratories. Prerequisite: Zoo 132

Zoo 353 Vertebrate Embryology Laboratory (2)

Study of the developmental anatomy of selected stages of the frog, chick and pig. Demonstrations and exercises in the preparation of embryonic materials for study purposes. 2 laboratories. Prerequisite: Zoo 303 (may be taken concurrently).

Zoo 412 Non-Infectious Diseases (3)

Malignant, deficiency, degenerative and other non-infectious diseases from the standpoint of etiology, manifestations and laboratory findings. 3 lectures. Prerequisite: Chem 328, Zoo 339 or Bio 431

Zoo 422 Histology (5)

Microscopic anatomy of principal tissues and organs of vertebrates with an introduction to histological techniques. 2 lectures, 3 laboratories. Prerequisite: Zoo 132. Recommended: Zoo 303 and Zoo 353

Zoo 425 Parasitology (4)

External and internal parasites of man and animals; life history; parasite-host relationships; control and recognition of species of clinical importance. 2 lectures, 2 laboratories. Prerequisite: Zoo 132. Recommended: Zoo 133

Zoo 426 Serology and Immunology (4)

Nature of innate and acquired immune reactions: theory and techniques of serological methods in diagnosing disease. Designed for preparing laboratory technologists. 2 lectures, 2 laboratories. Prerequisite: Consent of instructor.

Zoo 428 Hematology (3)

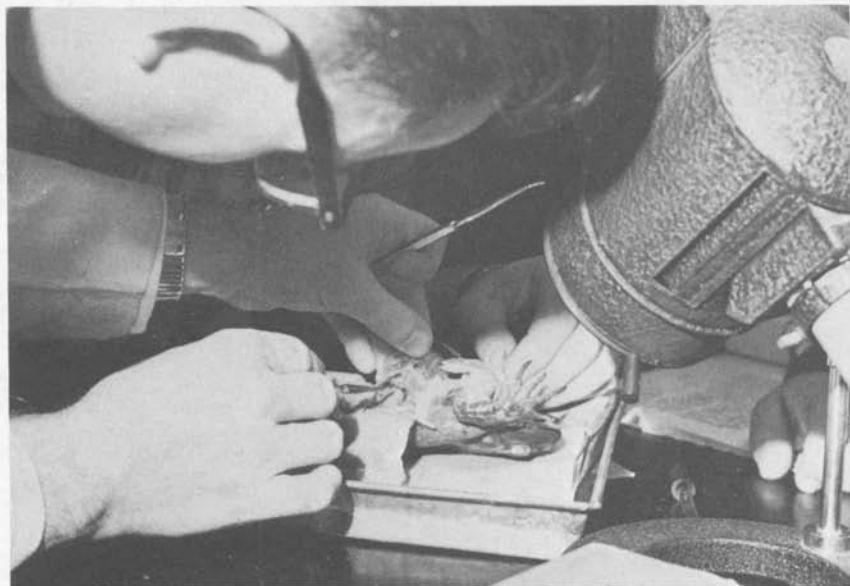
Microscopic and chemical examination of blood. Designed for preparing laboratory technologists. 2 lectures, 2 laboratories. Prerequisite: Consent of instructor. Recommended: Zoo 426

Zoo 524 Functional Vertebrate Morphology (3)

Discussion and critical evaluation of selections from the modern anatomical literature. Locomotor and feeding mechanisms. Dissections of skeleto-muscle mechanisms. 1 lecture, 2 laboratories. Prerequisite: Zoo 325 or consent of instructor. Recommended: Zoo 329

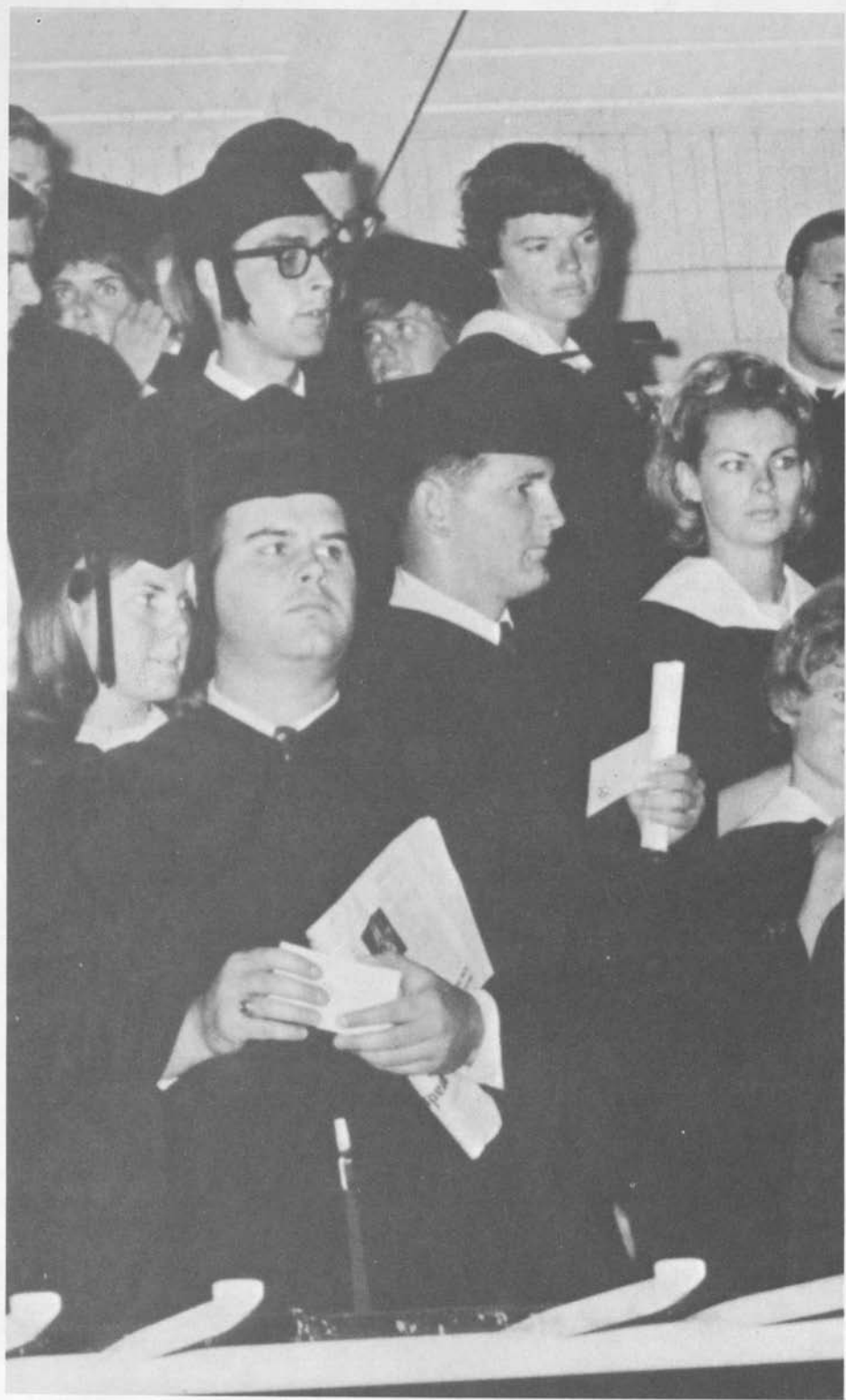
Zoo 590 Seminar in Zoology (1)

Problems and topics in advanced zoology selected according to the interest and needs of the students enrolled. Maximum of 3 units. 1 lecture. Prerequisite: Graduate status and evidence of satisfactory preparation in zoology.





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C. E. Knott	Mechanical Engineering and Dean of Engineering
Richard Leach	Poultry Industry
Reynold H. Lonborg	Crops
Ena L. Marston	English
M. C. Martinsen	Aeronautical Engineering
C. O. McCorkle	Agricultural Economics and Dean of the College
Douglass W. Miller	Journalism
Robert H. Reece	Mechanical Engineering
Carlos C. Richards	Engineering Technology
Torleif M. Rickansrud	Physics
John P. Riebel	English and Speech
Vard M. Shepard	Animal Husbandry and Dean of Agriculture
Ralph E. Weston	Mathematical Sciences
Francis F. Whiting	Engineering Technology
Dorothy S. Wright	Librarian



FACULTY AND STAFF

(Number in parentheses indicates year of appointment)

Listed as of January, 1971

ABITIA, FRED (1969).....Industrial Technology
B.A., San Jose State College, 1964; M.A., 1966; additional graduate study, Washington State University.

Experience: Technician, Engineering Department, San Jose State College; Teacher, Abraham Lincoln High School, San Jose; Instructor, San Jose State College; Assistant Professor, Chico State College; Assistant Professor, Washington State University.

ADAMS, JOHN P., JR. (1970).....Economics
M.A., Claremont Graduate School, 1968; additional graduate study, University of South Carolina and Claremont Graduate School.

Experience: Military assistance plans officer, JUSMAG—Thailand; advisor to Directorate of Operations, Royal Thai Army; instructor, California State Polytechnic College, Kellogg-Voorhis; staff associate/director, Claremont Manpower Institute, Claremont Graduate School; Lt. Colonel, U. S. Army.

ADAMSON, ROBERT W. (1953).....Mechanical Engineering
B.S., Ch.E., Tulane University, 1941; M.S., Ch.E., Oregon State College, 1948.

Experience: Petroleum refinery engineer, Standard Oil Company of New Jersey; instructor, mechanical engineering, Oregon State College; research assistant, industrial sales engineer, Union Oil Company of California. Registered professional engineer, California.

ALBERTI, ROBERT E. (1969).....Counselor
B.S., California State Polytechnic College, San Luis Obispo, 1959; M.A., California State College, Los Angeles, 1962; Ph.D., Michigan State University, 1969.

Experience: Associate Dean of Students and assistant to the vice president, California State Polytechnic College, Pomona; senior graduate assistant, Michigan State University; program director, Memorial Union, Arizona State University; coordinator of student activities, California State College, Los Angeles; research technician, University of California, Los Angeles.

ALEXANDER, WILLIAM M. (1958).....Head, Social Sciences Department
B.S., Oregon State University, 1949; M.S., 1951; M.A., Pennsylvania State University, 1953; Ph.D., University of Oregon, 1962; additional graduate study, University of Stockholm, George Washington University, University of Georgia.

Experience: Management assistant, U.S. Geological Survey; teaching fellow, University of Oregon; instructor, Oregon State University; Fulbright professor of political science, India.

AL-HADAD, SABAH (1965).....Mathematics
B.S., Texas Technological College, 1960; M.A., California State Polytechnic College, 1962; additional graduate study, California State Polytechnic College.

Experience: Director, Ministry of Agricultural Development, Baghdad, Iraq.

ALLEN, RAY R. (1955).....Engineering Technology and Environmental Engineering
B.A., Santa Barbara State College, 1942; M.A., California State Polytechnic College, 1965; additional graduate study, University of Southern California.

Experience: Chemist, Ventura Coastal Lemon Co.; technician, U.S. Air Force; instructor, U.S. Naval Air Technical Training Center; consultant, USAID, Africa.

AMARAL, ALFRED W. (1967).....Executive Director, Foundation
B.S., California State Polytechnic College, 1964; M.B.A., Golden Gate College, 1970.

Experience: Assistant manager, G. L. Soares Labor Contractor; assistant sales manager, Martin Produce, Inc.; agricultural representative, Wells Fargo Bank; Instructor, Agricultural Management, Cal Poly, SLO.

Faculty and Staff

AMATO, ANTHONY J. (1955) Ornamental Horticulture
B.S., California State Polytechnic College, 1949; graduate study, California State Polytechnic College.

Experience: Instructor, Mt. San Antonio Junior College, Pomona; Oakland Junior College; landscape architect and contractor, Walnut Creek, California; officer, U.S. Air Force.

ANDERSEN, OLIVE M. (1958) Mathematics
B.A., University of Madras, India, 1928; L.T., 1929; M.A., California State Polytechnic College, 1961.

Experience: Teacher, Stanes European High School, Coonoor, India; Baldwin Girls' High School, Bangalore, India.

ANDERSON, ELIZABETH B. (1958) English
B.S., Ohio University, 1938; M.A., California State Polytechnic College, 1959; additional graduate study, University of California, Santa Barbara.

Experience: Reporter and feature writer, Athens Messenger, Athens, Ohio; copywriter, Cleveland Press, Cleveland, Ohio; advertising department, General Electric Company, Bridgeport, Connecticut; free-lance writing.

ANDERSON, RICHARD A. (1947) Men's Physical Education
B.S., University of Southern California, 1942; M.S., 1947; additional graduate study, University of California at Los Angeles.

Experience: Playground director, Los Angeles Playground and Recreation Department; officer, U.S. Navy; swimming pool director, South Pasadena; assistant instructor in physical education and assistant swimming coach, University of Southern California.

ANDERSON, ROY E. (1949) Business Administration
A.B., Pacific Lutheran College, 1940; M.A., Stanford University, 1948; M.B.A., 1952; Ed.D., 1963.

Experience: Assistant manager, Hancock Oil Company, Tacoma, Washington; teacher, Parkland and Tacoma, Washington, public schools systems; officer, U.S. Army; instructor, Monterey Peninsula College, Monterey, California; National Park ranger; dean, arts and sciences division, California State Polytechnic College.

ANDERSON, RUSSELL K. (1955) Animal Science
B.S., University of Minnesota, 1948; M.S., Iowa State College, 1950; Ph.D., 1956.

Experience: U.S. Air Force; instructor, Animal Husbandry Department, Iowa State University.

ANDERSON, WARREN R. (1946) Electrical Engineering
B.S., University of Minnesota, 1939; B.S., Louisiana State University, 1944; graduate study, Central Signal Corps School, Camp Crowder, Missouri.

Experience: Teacher of agricultural science, Windom, Minnesota; engineer, Plant Engineering Agency, Philadelphia; engineer, Automatic Electric Company, Chicago. Registered professional engineer, California.

ANDO, MICHIO (1968) Architecture
B. Arch., Waseda University; M.S. Arch., 1965; M. Arch., Massachusetts Institute of Technology, 1966; additional graduate study, Boston University, Penn. State University.

Experience: Draftsman-designer, Nishimura Associates, Tokyo; chief-designer, Institute of Industrial Science, University of Tokyo; designer, Steffan Associates, Boston, and Kelman Associates, Dallas; instructor, Texas Tech. University. Registered architect, Japan.

ANDOLI, FREDERICK P. (1968) Biological Sciences
B.A., Upsala College, 1963; M.S., Utah State University, 1968.

Experience: Teaching assistant, Upsala College, Utah State University; research supervisor, Army Chemical Corps.

Faculty and Staff

- ANDREINI, ROBERT L. (1954)**.....Speech
B.A., Stanford University, 1941; M.A., 1949; additional graduate study, University of California, Berkeley, Teachers College, Columbia University.
Experience: U.S. Air Force; Royal University of Pisa, Italy; teacher, California high schools.
- ANDREOLI, ALFRED E. (1963)**.....Aeronautical Engineering
B.S., University of Colorado, 1954; M.S., California Institute of Technology, 1956; additional graduate study, University of Colorado.
Experience: Test engineer, aerodynamicist, Northrop Aircraft; assistant professor, Los Angeles State College; teaching associate, University of Colorado.
- ANDRESEN, JAMES G. (1956)**.....Mechanical Engineering
B.S., California State Polytechnic College, 1956.
Experience: U.S. Army.
- ANDREWS, DALE W. (1950)**.....Academic Vice President
B.S., University of California, Davis, 1941; M.A., California State Polytechnic College, 1952; Ph.D., University of Minnesota, 1957.
Experience: Director of agriculture and supervising teacher, Merced Union High School; director of agriculture and supervising teacher, Arroyo Grande Union High School, Arroyo Grande; officer, U.S. Marine Corps; agricultural teacher trainer, instructional materials coordinator, and special educational services coordinator, Dean of the College, Vice President, California State Polytechnic College; senior Danforth associate.
- ARMENTROUT, WILLIAM W. (1953)**.....Coordinator, Secondary Education
B.J., University of Missouri, 1939; A.B., Colorado State College of Education, 1940; M.A., Columbia University, 1940; Ed.D., Stanford University, 1953.
Experience: Guidance counselor, Menlo School and College; personnel classification officer and personnel consultant, U.S. Air Force; associate registrar, Stanford University; test officer, assistant to Dean of Arts and Sciences, California State Polytechnic College.
- ASBURY, ROBERT F., JR. (1964)**.....Architecture
B.S., University of Kansas, 1954; M. Arch., 1961.
Experience: Assistant professor, University of Kansas; designer-draftsman, various architectural firms; U.S. Air Force. Registered architect, Kansas.
- ATLEE, CHARLES B., JR. (1969)**.....Crops Science
B.S., Pennsylvania State University, 1950; M.S., University of California, Davis, 1962.
Experience: Farm adviser, University of California Agricultural Extension Service, Santa Cruz and Monterey Counties; horticulture adviser, U.S. Agency for International Development, Guatemala, Central America.
- ATTALA, EMILE E. (1970)**.....Computer Science & Statistics
B.S., Cairo University, Cairo, Egypt, 1958; M.S., University of California, Berkeley, 1964; additional graduate study, Fullerton State College.
Experience: Engineer, Shell Oil Company; member technical staff, Autonetics, Astrodata Inc.; evening instructor, Los Angeles Trade Technical College; member technical staff, TRW Systems Group, Redondo Beach, California.
- AUSTBO, TOMAS (1969)**.....Mathematics
B.A., Portland State University, 1966; M.A., University of California, Santa Barbara, 1969.
Experience: Meteorologist assistant, Norwegian Air Force; mathematics tutor, Portland State University; teaching assistant, National Science Foundation Institute for High School Teachers, University of California, Santa Barbara.
- AVILA, JOHN H. (1970)**.....Mathematics
B.S., University of Santa Clara, 1963; M.A., University of Maryland, 1966; Ph.D., 1971.
Experience: Graduate teaching assistant, University of Maryland; mathematician programmer, Naval Ship Research and Development Center; associate staff, Operations Research, Inc.

Faculty and Staff

BABB, JAMES H. (1959) Graphic Communications
Experience: Fifteen years experience in printing, 6½ of which was as owner of Visalia Printing Service.

BACHMAN, ALFRED M. (1970) Mathematics
B.S., Oregon College of Education, 1952; M.Ed., 1960, M.S., 1964; Ph.D., 1968, University of Oregon.

Experience: Associate professor, California State College, Fullerton; visiting professor, Temple University; assistant professor, Lane Community College; assistant professor, Portland State University; elementary and high school teaching.

BACON, JAMES P., JR. (1967) Biological Sciences
A.B., Carleton College, 1961; M.S., Michigan State University, 1962; Ph.D., University of Chicago, 1969.

Experience: Research and field assistant, Field Museum of Natural History of Chicago, Michigan State University; teaching assistant, University of Chicago.

BAGNALL, JAMES R. (1969) Architecture
B.A., Occidental College, 1957; graduate study, U.C. Berkeley, 1965.

Experience: Designer, Robertson Montgomery, San Francisco and James Robertson, Sausalito; exhibits designer, The Oakland Museum; private practice, Berkeley, California.

BAILEY, PHILIP S. (1969) Chemistry
B.S., University of Texas, 1964; Ph.D., Purdue University, 1969.

Experience: Research assistant, University of Texas; instructor and research assistant, Purdue University.

BAILEY, ROGER S. (1962) Art
B.A., Allegheny College, 1949; M.A., State University of Iowa, 1951.

Experience: Supervising teacher, State University of Iowa; art instructor, Coronado High School and La Mesa Junior High School; art supervisor, Escondido Union School District; instructor in art education, University of California Extension; Palomar Junior College and Pacific Lutheran University, Washington.

BAKER, EDWARD H. (1968) Mechanical Engineering
B.S., Northwestern University, 1958; M.S., University of California, 1963; Ph.D., Northwestern University, 1965.

Experience: Senior technical specialist, North American Rockwell Corporation.

BALDWIN, VIRGINIA (1970) Library
B.A., Vassar College, 1927; M.A., School of Library Service, Columbia University, 1932.

Experience: Cataloger, New York Public Library, University of California at Santa Barbara, California State Library.

BALL, R. WAYNE (1969) Medical Officer
M.D., University of Missouri School of Medicine, 1961.

Experience: Internship, Mercy Hospital, Des Moines, Iowa; residency, Santa Barbara General Hospital, Santa Barbara, California; private practice, Santa Maria, California.

BALTHASER, LAWRENCE H. (1969) Physics
B.A., Rutgers University, 1960; M.A., Indiana University, 1963; Ph.D., 1969.

Experience: Map draftsman, Sun Oil Company; field assistant, New Jersey Agricultural Experiment Station; teaching assistant, Indiana University; assistant professor, Southampton College.

BANKS, BERNARD W. (1969) Mathematics
B.A., San Diego State College, 1964; M.S., 1967.

Experience: Pilot officer, Royal Air Force; engineering aid, Aeroflex Corp.; tutor, National Science Foundation; mathematician, Naval Undersea Warfare Center; teaching assistant and lecturer, San Diego State College.

Faculty and Staff

BARKER, EDWARD H. (1971).....Dean, School of Business and Social Sciences
B.A., University of California at Los Angeles, 1937; M.S., University of Southern California, 1945; Ph.D., 1963.

Experience: Instructor, Los Angeles Manual Arts High School, United States Army Air Force, and Columbia Broadcasting System; professor, University of Southern California; salesman and bookkeeper, Sydney E. Walsh Agency, Los Angeles; production control, Vultee Aircraft, Downey, California; executive, Barker Bros. Corporation, Los Angeles; sales manager, Market Research Associates, Pasadena.

BARNES, TIMOTHY M. (1969).....History
B.A., University of New Mexico, 1965; M.A., 1966; Ph.D., 1970.

Experience: Instructor, University of Albuquerque; graduate assistant, University of New Mexico.

BARR, STANLEY L. (1959).....English
B.A., St. Bernardine of Siena College, 1953; M.A., University of Michigan, 1955; additional graduate study, University of Wisconsin, Harvard University, University of Oregon.

Experience: Teacher, Michigan Public Schools; assistant professor, Lakeland College; instructor, Wisconsin State College.

BARROWS, FRANK B. (1968).....Industrial Technology
B.S., U.S. Merchant Marine Academy, 1949; additional graduate study, San Francisco State College, University of Houston, Utah State University.

Experience: Research and teaching assistant, Utah State University; assistant professor, University of Southern California; instructor, College of San Mateo; teacher, Westmoor High School; engineer, various merchant vessels; officer, U.S. Navy.

BARROWS, ROBERT S. (1970).....Counselor
B.S., University of New Hampshire, 1959; M.Ed., State University of New York at Buffalo, 1965; Ed.D., State University of New York at Albany, 1970.

Experience: Counselor, Urban Center, State University of New York; visiting professor, State University College, Oneonta, New York; teaching assistant, State University of New York at Albany; counselor, secondary schools, Wappingers Falls, New York; teacher of agriculture, Poland, New York; U. S. Navy.

BAUMGARTEN, GEORGE M. (1969).....Architecture
B. Arch., University of Michigan, 1947; graduate studies, New York Structural Institute and New School of Social Research.

Experience: Lecturer, Old Dominion University; private practice; project architect, John Graham & Co.; project coordinator, Victor Gruen Association; zoning analyst, Harrison, Ballard and Allen; designer, Skidmore, Owings and Merrill; Registered architect, New York, Michigan, Virginia, Florida.

BAUR, LAWRENCE E., JR. (1965).....Business Administration
B.B.A., University of Michigan, 1954; M.B.A., 1957

Experience: Staff accountant, Wagar, Lunt and Oehring, Michigan; accountant, U.S. General Accounting Office, Los Angeles; staff accountant, Touche, Ross, Bailey and Smart, Los Angeles; staff accountant and partner, Charles Belcher and Company, San Luis Obispo; Certified Public Accountant; U.S. Army.

BEATIE, GEORGE C., JR. (1959).....Associate Dean, Special Programs
A.B., University of California at Santa Barbara, 1949; M.A., California State Polytechnic College, 1956; additional graduate study, University of California at Santa Barbara, Northwestern University.

Experience: Assistant instructor, University of California at Santa Barbara; music director, USNR, University of Rochester, New York; teacher, Nipomo Elementary School, Oceano Elementary School, Arroyo Grande Union High School; director, student activities, Arroyo Grande Union School; band director, class program scheduler, California State Polytechnic College, San Luis Obispo.

Faculty and Staff

- BEAUCHAMP, ROBERT O. (1970)**.....Architecture
 B.A., University of California, Berkeley, 1957.
 Experience: Private practice, Santa Monica; housing construction consultant, Victor Gruen Assoc., construction supervisor, Frank O. Gehry & Assoc.; draftsman, job captain for various architectural firms; registered architect, California.
- BEAUVAIS, H. PAUL (1970)**.....Senior Clinical Laboratory Technologist
 Hospital Corps School, Medical Dept., U.S. Navy, 1942; Glendale College, 1949-51.
 Experience: Chief laboratory technologist, Northridge Hospital, Northridge, California; Facey Medical Group, Granada Hills, California.
- BEECHER, LLOYD N. (1969)**.....History
 B.A., California State College, Fullerton, 1965; M.A., 1966, Ph.D., University of Georgia, 1970.
 Experience: graduate assistant, California State College, Fullerton; teaching assistant, University of Georgia.
- BEGG, IAN C. (1970)**.....Mechanical Engineering
 B.S.M.E., Witwatersrand University, Johannesburg, South Africa, 1941; B.S.E.E., 1946; M.S., University of California, Berkeley, 1970.
 Experience: Senior project engineer, The Rucker Co., Oakland; plant and tool engineer, Gilro Machine & Stamping Co., Oakland; tool designer, Kearney & Trecker Corp., Milwaukee, Wisconsin; production engineer, First Electric Corp., Knights, Transvaal South Africa; test engineer, Electricity Supply Commission, Rosherville, Johannesburg; college apprentice, Metropolitan-Vickers Electrical Co., Trafford Park, Manchester, England; chief petty officer, South African and Royal Navies; Corporal, South African Engineering Corps.
- BEHMAN, SARA A. (1971)**.....Economics
 A.B., University of Pennsylvania, 1943; M.G.A., 1944; Ph.D., University of California, Berkeley, 1966.
 Experience: Labor market analyst, California Department of Employment; research technician, California Senate Interim Committee on State and Local Taxation; historical assistant, Chicago Quartermaster Depot; research assistant, Department of Internal Affairs, Commonwealth of Pennsylvania; director of research, Center for Labor Research and Education at the Institute of Industrial Relations, University of California, Berkeley; lecturer, University of California, Berkeley; assistant professor, San Jose State College.
- BERGHELL, JOY GARRISON (1956)**.....Library
 B. of Journalism, University of Missouri, 1935.
 Experience: Copywriter, public relations and promotion, Los Angeles Times; account executive, R. W. Webster Advertising, Los Angeles; editorial writer, Southwestern Signal Corps Training Center, San Luis Obispo; free-lance advertising, publicity and newspaper writer.
- BERGTHOLD, FREDERICK M., JR. (1969)**.....Engineering Technology
 B.S., California State Polytechnic College, 1958; M.S., University of Southern California, 1968.
 Experience: U.S. Air Force; Central Office Equipment Installer, Western Electric Corporation; radio technician, California Air National Guard; instrument research engineer, Ames Research Center; electronic engineer, Interstate Electronics; engineering specialist, Philco-Ford Corporation.
- BERMANN, JAMES (1964)**.....Agricultural Engineering
 B.S., California State Polytechnic College, 1959, 1961.
 Experience: Chief engineer, Grether Agricultural Co.; Farming; U.S. Army.
- BETHEL, ARTHUR C. W. (1968)**.....Philosophy
 B.A., University of California, Santa Barbara, 1964; M.A., 1968.
 Experience: Associate instructor, University of California, Santa Barbara.
- BETZ, ELLARD W. (1947)**.....Engineering Technology
 B.A., Santa Barbara State College, 1942.
 Experience: U.S. Navy; teacher, Victorville, California.

Faculty and Staff

- BEYMER, CHARLES R. (1966)** Library
 B.S., University of Wisconsin, 1950; M.L.S., 1955; graduate study, University of Wisconsin, University of California, Berkeley.
 Experience: Cataloger, Marquette University, Cornell University, Finger Lakes Library System, Ithaca, New York; science reference librarian, University of Notre Dame.
- BILLINGSLEY, JOHANNA (1969)** Library
 B.A., Saint Mary's College, 1966; M.L.S., State University of New York at Geneseo, 1967.
 Experience: Reference Librarian, University of Montana.
- BIRKETT, RICHARD J. (1955)** Animal Science
 B.S., California State Polytechnic College, 1953; M.S., Kansas State University, 1963.
 Experience: Feed and milling supervision, Union Stock Farms, Blythe, California; research assistant, Kansas State University.
- BISHOP, CHESTER O. (1957)** Mechanical Engineering
 B.S., McPherson College, 1929; M.S., Texas A.&M. College, 1955.
 Experience: Professor, Arkansas Tech; Hind Junior College, Raymond, Mississippi; instructor, San Angelo College, Texas; Copiah-Lincoln Junior College, Wesson, Mississippi; Texas A.&M. Radar School; engineer and manager, B & M Machine Co., Grenada, Mississippi.
- BISHOP, ROSEANN (1970)** Home Economics
 B.S., University of Utah, 1967.
 Experience: Dietary assistant, Clinical Research Center, University of Utah Medical Center; staff dietician, Centinela Valley Community Hospital, Inglewood; consulting dietitian, Visiting Nurse Association of Los Angeles.
- BLOOM, EMMETT A. (1946)** Animal Science
 B.S., University of California, Davis, 1934.
 Experience: Agricultural instructor at Ripon, Laton, and Corning High Schools.
- BOCHE, RAYMOND E. (1969)** Director, Computer Center
 B.S., California State Polytechnic College, SLO, 1958; M.S., San Jose State College, 1966; additional graduate study, Texas Technological College.
 Experience: Computing, mathematics and operations research, The Boeing Company, Seattle; Technical Operations, Inc., Monterey and Washington, D.C.; Laboratory for Electronics, Monterey; Lockheed Missiles and Space Co., Palo Alto and Sunnyvale; assistant director of the Computer Center and assistant professor of Industrial Engineering and Computer Science, Texas Technological College.
- BODLAK, DAVID B. (1969)** Art
 B.A., University of California, Santa Barbara, 1960; M.F.A., Claremont Graduate School, 1966.
 Experience: Assistant Dean, and instructor in painting and drawing, Chouinard Art School; director of admissions, California Institute of the Arts; faculty, Ohio University College of Fine Arts; gallery assistant, Scripps College; teaching assistant, Claremont Graduate School.
- BONGIO, ENRICO P. (1948)** Welding and Metallurgical Engineering
 A.B., Chico State College, 1948; M.A., California State Polytechnic College, 1965.
 Experience: Welder, Chicago Bridge and Iron Co. and Eureka Boiler Works and Steel Products, Eureka, California; U.S. Army Signal Corps; instructor, Sonoma Valley Union High School, Sonoma, California; metals inspector and welding instructor, Hunters Point Naval Shipyard; nondestructive testing technician, Ferro-Spec Laboratory, Los Angeles; instructor, welding operator qualification tests, Bethlehem Steel Co., Pinole, California.
- BOONE, JOSEPH C. (1968)** Physics
 B.A., Earlham College, 1962; M.A., University of Wisconsin, 1967; Ph.D., 1970.
 Experience: Teaching and research assistant, University of Wisconsin.

Faculty and Staff

BOOTHE, ROBERT O. (1954).....Foreign Language and Linguistics
B.A., University of Wisconsin, 1950; M.A., Los Angeles State College, 1953; additional graduate study, University of California at Los Angeles, Los Angeles State College, University of Michigan, Stanford University and University of the Americas.

Experience: Toolmaker and tool designer, Electrical Engineering and Mfg. Corp.; project engineer, Virtue Bros. Mfg. Co.; tooling engineer, McCulloch Motors Corp.; free-lance photographer and journalist; instructor, El Camino College, Compton College; Fulbright professor of English, University of Santiago de Compostela, Spain.

BOROUGHES, HOWARD (1970).....Associate Dean, Graduate Studies and Research
B.A., University of Southern California, 1949; Ph.D., California Institute of Technology, 1953.

Experience: Research Fellow, UCLA, University of Paris; Associate Professor, University of Hawaii; Professor and Head of Nuclear Energy Program, Inter-American Institute of Agricultural Sciences (OAS); Program Director and Staff Associate, National Science Foundation; Assistant Division Director, Bureau of Higher Education, Office of Education; Dean of Faculties, Portland State University.

BOSTROM, ROBERT M. (1956).....Director, Housing
B.S., California State Polytechnic College, 1956; M.A., 1970.

Experience: Graduate manager, California State Polytechnic College.

BOWDEN, FREDERICK W. (1949).....Head, Electrical Engineering Department
B.S., California Institute of Technology, 1932; M.S., 1933; additional graduate study, California Institute of Technology.

Experience: Geophysics, Shell Oil Company; electrical engineer, Oilfields Service Co.; mechanical and electrical consultant, Walt Disney Enterprises; head electrical research department, Lockheed Aircraft Corp.; associate professor, University of Southern California College of Aeronautics. Registered professional engineer, California.

BOWLS, WOODFORD E. (1937).....Physics
A.B., University of California, 1932; M.A., 1935; Ph.D., 1937.

Experience: Teaching assistant and teaching fellow in physics, University of California.

BOYCE, WILLIAM M. (1966).....Business Administration
B.S., University of Connecticut, 1938; graduate work at George Washington University, California State Polytechnic College; graduate Command and General Staff College, 1945; Special Weapons Officer Course, 1955.

Experience: Infantry platoon leader, battalion commander and deputy battle group commander; instructor and committee chairman, U.S. Army Infantry School, Ft. Benning, Georgia; inspector general; member of Department of the Army general staff and the joint staff of the Joint Chiefs of Staff, Washington, D.C.; head, Military Science Department, Director of Developmental Affairs, California State Polytechnic College.

BRADY, MARY L. (1968).....Library
B.A., Mundelein College, 1960; M.A.L.S., Rosary College, 1966.

Experience: Editorial assistant, The National Catholic Monthly, Chicago; cataloger, Mundelein College.

BREAZEALE, CONNIE R. (1966).....Home Economics
B.S., California State Polytechnic College, 1960; M.S., 1966.

Experience: Chairman, Home Economics Department, Santa Maria High School.

BRECKAN, ERLING A. (1958).....Business Administration
B.S., University of Illinois, 1941; M.B.A., University of California at Los Angeles, 1952.

Experience: Officer, U.S. Army; lecturer, University of California at Los Angeles; assistant to plant manager, Neomatic, Inc.

Faculty and Staff

- BRENNAN, ANDREW (1968)**.....Men's Physical Education
 B.S., University of Southern California, 1958; M.S., 1960.
 Experience: Graduate assistant, University of Southern California; teacher/coach, Mira Loma High School, Glendale High School, Downey High School, Rio Hondo Junior College.
- BRENNER, PATRICIA A. (1970)**.....English
 B.S., Bob Jones University, 1957; M.A., Middlebury College, 1963; Ph.D., Kent State University, 1970.
 Experience: Teacher, Binghamton, N.Y., Winchester, Massachusetts, Beachwood, Ohio, Kent State University, Ohio.
- BRIDGES, LARRY M. (1970)**.....Men's Physical Education
 B.S., Indiana State University, 1963; M.S., 1964; second M.S., 1969.
 Experience: Graduate assistant/teaching fellow, Indiana State University; instructor, Public School, Marian College, Indianapolis, and Wayne State University.
- BRODIE, DAVID A. (1970)**.....Architecture
 B. Arch., University of Capetown, S. Africa, 1953; M. Arch., University of California, Berkeley, 1964.
 Experience: Assistant planner, City of Oakland; professor, and teaching assistant, UC Berkeley; architect for various firms in England and Rhodesia.
- BROMLEY, J. PHILIP (1947)**.....Agricultural Management
 B.S., University of Southern California, 1934; M.S., 1936; additional graduate study, Columbia, Texas A & M, and University of California.
 Experience: Teacher, Garvey School District; instructor, San Diego State College; officer, U. S. Navy; business education specialist, Evelyn Hone College of Further Education, Lusaka, Zambia, for U.S. Agency of International Development.
- BROWDER, MARY (1969)**.....Library
 B.S., Bowling Green State University, 1964; M.L.S., University of Texas, 1969.
 Experience: Library assistant, Bowling Green State University; teacher, Lompoc Unified School District; Librarian, Meadowvale Elementary School, Maryland and Austin Public Library, Texas; senior library assistant, University of Texas Undergraduate Library.
- BROWN, HOWARD C. (1946)**.....Head, Ornamental Horticulture Department
 B.S., California State Polytechnic College, 1943; M.S., Ohio State University, 1954; Ph.D., 1963.
 Experience: U.S. Army Air Force.
- BROWN, MARVIN D. (1956, 1964)**.....English
 A.B., Washburn College; B.D., Andover Newton Theological School, 1936; S.T.M., 1939; Th.D., Iliff School of Theology, Denver, 1952. Additional graduate study, University of Denver.
 Experience: Pastor, Garden City, Kansas and Santa Barbara and San Luis Obispo, California; instructor, California State Polytechnic College; chaplain, U.S. Army.
- BROWN, ROBERT J. (1969)**.....Biological Sciences
 B.S., California State College, Los Angeles, 1964; M.S., Arizona State University, 1967; additional graduate study, University of Toronto, Ontario, Canada.
 Experience: Teaching assistant, California State College, Los Angeles; research assistant, Arizona State University; teaching assistant, University of Toronto.
- BROWN, STANLEY B. (1969)**.....Education
 B.S., Louisiana State University, 1941; M.S., Stanford University, 1946; Ed.D., 1951.
 Experience: Professor and chairman, Department of Education, University of Utah; dean of instruction, Southwestern Oregon Community College; head, science education, Indiana University and University of California, Berkeley; Fulbright professor, India; AID science specialist, Brazil; flight control officer, U.S. Navy.

Faculty and Staff

- BROWN, WILLIAM H. (1957)**.....Director, School of Architecture and Environmental Design
B. Arch., University of Florida, 1954; M. Arch., 1968; additional graduate study, University of Sydney.
Experience: Draftsman, Trend Associates, L. C. Kingscott and Associates, Viking Products Company, Valley Metal Products Company; instructor, University of Florida; architectural designer, John E. Piercy, D. Stewart Kerr; private practice. Registered architect, California.
- BRUCKART, WILLIAM L. (1969)**.....Industrial Technology
B.S., University of Kentucky, 1942; M.S., Ohio State University, 1953; additional graduate study, Bowdoin College and Massachusetts Institute of Technology.
Experience: Officer, U.S. Navy; engineer, Southern Liquid Gas Co., Dothan, Alabama; assistant chief, non-ferrous physical metallurgy group, Battelle Memorial Institute, Columbus, Ohio; sales manager, Cyclops Corporation, Bridgeville, Pennsylvania; consultant, Pittsburgh, Pennsylvania; manager, metallics and refractories, Aerojet-General Corporation; consultant, Torrance, California; chief engineer, Fansteel, Inc., Advanced Structures Division.
- BRUNK, ATHOL J. D. (1957)**.....Physics
B.S., Northwestern State Teachers College, 1937; M.A., West Texas State Teachers College, 1941.
Experience: Instructor in mathematics and science, high school, Beaver, Oklahoma; elementary principal, Alamogordo, New Mexico; officer, U.S. Navy; mathematics instructor, Atascadero, California.
- BUCCOLA, VICTOR A. (1962)**.....Men's Physical Education
B.S., California State Polytechnic College, 1956; M.A., 1957.
Experience: Officer, U.S. Army; physical education instructor and athletic coach, The College of Idaho; science and math instructor and athletic coach, Mark Keppel High School.
- BUCICH, RICHARD A. (1963)**.....Electronic Engineering
B.S.E.E., Illinois Institute of Technology, 1954; M.S.E.E., 1956.
Experience: Sub-station operator, electrical engineer, U.S. Steel Corporation; graduate assistant, Illinois Institute of Technology; assistant professor, Purdue University Center.
- BUCY, L. LAVERNE (1955)**.....Animal Science
B.S., University of Kentucky, 1943; M.S., 1950; Ph.D., University of Illinois, 1954.
Experience: Graduate assistant in animal science, University of Illinois; teacher of vocational agriculture, Kentucky high schools; farming; U.S. Navy.
- BUFFA, ANTHONY J. (1970)**.....Physics
B.S., Rensselaer Polytechnic Institute, 1964; M.S., University of Illinois, 1966; Ph.D., 1969.
Experience: Teaching aide, Rensselaer Polytechnic Institute; teaching assistant, research assistant, University of Illinois; lecturer, California State Polytechnic College, San Luis Obispo.
- BURLINGHAM, HERBERT H. (1948)**.....Head, Agricultural Education Department
B.S., Oregon State College, 1929; graduate study, University of California.
Experience: Executive student, Swift and Company; director of agriculture, Willits Junior-Senior High School; director of agriculture and critic teacher, Madera Union High School, Paso Robles Union High School; regional supervisor, State Bureau of Agricultural Education, California.
- BURROUGHS, SARAH E. (1967)**.....Home Economics
B.S. and Certificate in Medical Technology, University of Michigan, 1956; Ph.D., University of California, 1967.
Experience: Senior technician, University Hospital, Ann Arbor; biochemist, Akron General Hospital, Ohio; supervising chemist, Parma Community Hospital, Ohio; biochemist, Stanford Research Institute; research/teaching assistant, University of California, Berkeley.

Faculty and Staff

BURT, WALLACE H. (1968).....Business Administration
B.S., University of California, 1949; M.B.A., University of Denver, 1962; C.P.A., State of California.

Experience: Teacher, Shasta Union High School; assistant county superintendent of schools, Shasta County; certified public accountant, staff, Muncy and Company, C.P.A.'s instructor, Coalinga College; consultant, State of California.

BURTON, ROBERT E. (1968).....History
A.B., San Diego State College, 1962; M.A., University of Oregon, 1964; Ph.D., 1969.

Experience: Teaching assistant, University of Oregon; instructor, Glendale College.

BUSCHMAN, WILLIAM O. (1956).....Computer Science & Statistics
A.B., Reed College, 1941; M.Ed., University of Oregon, 1947; Ed.D., Oregon State University, 1953.

Experience: Marine engineering and naval architecture, Kaiser Co., and others; teaching, Portland Public Schools, Gresham Union High School; instructor, Multnomah College, Oregon State University; assistant professor, Oregon State System of Higher Education, General Extension Division; assistant professor, Portland State College; research, University of Oregon Medical School, Stanford Research Institute, and Institute for Motivational Research.

BUTLER, ROBERT O. (1964).....Mathematics
A.B., Fresno State College, 1951; M.A., California State Polytechnic College, 1967; graduate study, University of California, Los Angeles State College.

Experience: Teacher, Reedley, Dinuba, Orosi, Paso Robles; vice principal and principal, Paso Robles Union.

CAHILL, THOMAS V. (1969).....Computer Science & Statistics
A.B., Columbia College, 1930.

Experience: Instrument tester, New York Edison Company; engineer, Brooklyn Edison Company, Irving Trust Company, IBM Corporation; manager, IBM Corporation, Boston; instructor, University of California Extension, Los Angeles; president, Computer Procedures Inc.

CAIRNS, EDWARD A. (1969).....English
B.A., Stanford University, 1956; M.A., San Francisco State College, 1963; additional graduate work, University of Denver.

Experience: Instructor, University of Denver; assistant professor, Yankton College; teacher, San Francisco State College; instructor and supervisor of instructors, Cryptographic School, USAF.

CALL, TRACEY G. (1962).....Biological Sciences
B.S., Idaho State College, 1940; M.S., University of Maryland, 1944; A.B., Brigham Young University, 1947; Ph.D., University of Minnesota, 1956.

Experience: Teaching Assistant, Idaho State College; Teaching Assistant, University of Washington; Teaching Assistant, University of Maryland; Drug Store Manager, Afton, Wyoming; Assistant Professor, Duquesne University; Assistant Professor, University of Wyoming; Associate Professor, Montana State University; Research Pharmacologist, Sunkist Growers, Inc.; Project Director-Consultant, W.L.R.I., Holland-Rantos Youngs Rubber Corporation.

CAPURSO, ALEXANDER (1969).....Music
B.S., University of Kentucky, 1933; M.A., 1934; Ph.D., 1938.

Experience: Professor, head and executive director of Music Department, University of Kentucky; assistant director, Carnegie Community Study Project; director and professor, School of Music, Syracuse University; associate chairman and professor, Division of Creative Arts, San Francisco State College; research associate, Office of the Chancellor, California State Colleges; president, professor of Humanities and Fine Arts, Stanislaus State College.

Faculty and Staff

CARLSTON, RICHARD C. (1968).....Welding and Metallurgical Engineering
B.S., University of Missouri, 1951; M.S., 1954; Ph.D., University of Kansas, 1957.
Experience: Visiting professor, Naval Postgraduate School; adjunct professor, American University; physicist, Office of Naval Research, Aerojet-General Corporation; engineer, Grumman Aircraft Engineering Corporation; chemist, Sperry Gyroscope Company; physicist, Pacific Missile Range; editor, Naval Civil Engineering Laboratory.

CARNEGIE, E. J. (1963) (1965).....Agricultural Engineering
B.S., California State Polytechnic College, 1962; M.Eng., University of California, Davis, 1963.

Experience: Research assistant, University of California, Davis; junior agricultural engineer, University of California; officer, U.S. Naval Reserve.

CARPENTER, THOMAS W. (1968).....Aeronautical Engineering
B.S., Virginia Polytechnic Institute, 1961; M.S., 1964; Ph.D., Purdue University, 1969.

Experience: Research assistant, instructor, Purdue University; engineer, Hamilton Standard.

CARR, LAURENCE H. (1963).....Mechanical Engineering
B.S., University of Chicago, 1932; M.S., 1934.

Experience: Director of research and engineering, Edward Valves, Inc.; lecturer and assistant professor, Purdue University; mechanical engineer, Pacific Gas & Electric Co. Registered professional engineer, California.

CARR, MALCOLM J. (1970).....Social Sciences
B.A., University of Missouri, 1940; M.A., Indiana University, 1948; Ph.D., University of California, Los Angeles, 1970.

Experience: Economic analyst, War Labor Board, and War Assets Administration, Kansas City, Mo.; associate professor, Westminster College, New Wilmington, Pa. and Sam Houston State College, Huntsville, Texas; lecturer, Sacramento State College; assistant professor, San Diego State College; position classifier and management analyst, Sacramento Signal Depot, Hq. 8th Army, Tokyo, and Tachikawa Air Base, Japan; personnel research specialist, Naval Personnel Training and Research Laboratory, San Diego.

CARRUTHERS, RODERICK W. (1965).....Head, Graphic Communications
Department
B.A., St. Martin's College, 1964; graduate study, University of Wisconsin.

Experience: Apprentice printer, Vancouver Sun; linotype operator, Evergreen Press, Vancouver; superintendent, Campbell River Courier, British Columbia; offset preparation, Washington State Printing Plant, Olympia; printer, Indianapolis Star-News, Olympia News, and Wisconsin State Journal; business manager, North Island News, Campbell River, B.C.

CASS, MARJORIE (1957).....Education
B.S., University of Nebraska, 1932; M.A., Columbia University, 1945; additional graduate study, University of Missouri, 1947.

Experience: Teacher, Nebraska and Iowa; instructor, Stephens College; assistant professor, Grinnell College.

CHANDLER, EVERETT M. (1951).....Dean of Students
A.B., University of California, 1939; Ph.D., Michigan State University, 1970.

Experience: Administrative officer, U.S. Air Force; personnel technician, State Personnel Board; management analyst, State Department of Finance; extension teacher, Sacramento State College; U.S. Air Force.

CHASE, DANIEL C. (1954).....Agricultural Management Department
B.S., University of Arizona, 1946; M.Agr. Ed., 1951; Ed.D., Pennsylvania State University, 1954.

Experience: Teacher of vocational agriculture, veterans' instructor, Tolleson Union High School, Tolleson, Arizona; supervising teacher, University of Arizona; veterans' co-ordinating teacher, State Department of Vocational Education, Phoenix, Arizona; farm editor and columnist, *Arizona Republic*; assistant professor and head, division of farm management, Arizona State College, Tempe, Arizona.

Faculty and Staff

- CHESTNUT, F. STUART** (1963).....Men's Physical Education
 B.S., Indiana University, 1951; M.S., 1963.
 Experience: Technical supervisor of industrial athletics, Commercial Solvents Co.; coach-teacher, senior high school, Terre Haute, Indiana, senior high school, Washington, Indiana, senior high school, Brazil, Indiana.
- CHIZEK, GAYLORD J.** (1958).....Agricultural Management
 B.S., Kansas State College, 1957; M.S., 1958.
 Experience: Assistant instructor, Kansas State College, Manhattan, Kansas; farmer; U.S. Army.
- CHRISTENSON, ROBERT A.** (1970).....Acting Head, Child Development
 Department
 B.S., University of Utah, 1963; M.S., Brigham Young University, 1968; Ph.D., 1970.
 Experience: Teaching assistant, part-time instructor, Brigham Young University.
- CHOU, THOMAS T. L.** (1961).....Electronic Engineering
 B.S.E.E., Chinese National Chekiang University, 1947; M.S.E.E., University of Washington, 1956; additional graduate study, University of California at Los Angeles.
 Experience: Research fellow, NASA Ames Research Center, Moffett Field; senior research engineer, member technical staff, Autonetics, Division of North American Rockwell Corporation, Anaheim, California; associate professor, National Chiao-tung University, Taiwan; senior engineer, Sverdrup-Parcel, Inc., San Francisco; research assistant, University of Washington.
- CIROVIC, MICHAEL M.** (1968).....Electronic Engineering
 B.E., New York University, 1965; M.S., 1968.
 Experience: Assistant professor, Academy of Aeronautics; engineer, General Cable Corporation.
- CLEATH, ROBERT L.** (1968).....Speech
 B.A., Northwestern College, 1950; M.A., University of Oregon, 1951; Ph.D., University of Washington, 1963; B.D., San Francisco Theological Seminary, 1965.
 Experience: Assistant professor, Westmount College, Whitworth College, University of California; teaching assistant, University of Washington; instructor, California State Polytechnic College; assistant editor, *Christianity Today*, Washington, D.C.
- CLEMENTS, WILLIAM E.** (1966).....Physics
 B.S., Texas A. and I. University, 1965; M.A., 1966.
 Experience: Laboratory assistant, research assistant, assistant instructor, Texas Arts and Industries University; teaching specialist in mathematics, Presbyterian Pan American School.
- CLERKIN, EDWARD J.** (1964).....Electronic Engineering
 B.S.E.E., Colorado State University, 1950; M.S.E.E., University of Idaho, 1962; additional graduate study, Utah State University, Colorado State University, Oklahoma University.
 Experience: Instructor, University of Idaho and Chico State College; graduate assistant, Oklahoma University; technical associate, Argonne National Laboratory; engineer, Diversified Builders, General Electric Company, Rohr Aircraft Corp. Registered professional engineer, California.
- CLIMIE, JOANNE F.** (1970).....Women's Physical Education
 AB., San Diego State College, 1967; M.A., 1970.
 Experience: Purchasing agent, Stark Company, Philadelphia; laboratory assistant/summer instructor, San Diego State College; teacher, Parkway Junior High, La Mesa, and Monte Vista High School, Spring Valley.
- CLOGSTON, FRED L.** (1960).....Biological Sciences
 B.A., B.S., Western Washington College, 1950; M.S., University of Washington, 1956; Ph.D., 1965.
 Experience: Instructor, public schools; teaching and research assistant, University of Washington; research associate, Office of Naval Research; instructor, Western Washington College; associate, University of California at Santa Barbara.

Faculty and Staff

CLOONAN, CLIFFORD B. (1957).....Electronic Engineering
B.S., University of Colorado, 1955; M.S.E.E., Montana State College, 1961.
Experience: Instructor, U.S. Army Signal Corps; physical science aide, National Bureau of Standards, Boulder, Colorado; systems design engineer, Collins Radio Company, Cedar Rapids, Iowa; research associate and research assistant, Electronic Research Laboratory, Montana State College; consultant, McDonnell Aircraft Company, St. Louis, Missouri; microwave engineer, Hewlett-Packard Company, Palo Alto.

CLUCAS, GEORGE G. (1956) (1968).....Social Sciences
A.B., University of Michigan, 1947; M.P.A., 1949; Ph.D., University of Southern California, 1969.

Experience: Senior budget analyst, Office of Legislative Analyst, Sacramento; dean, Finance and Development, California State Polytechnic College; chief, Budget Planning and Operations, Chancellor's Office, The California State Colleges, Los Angeles; director, Research and Development and Interim Dean, School of Business and Social Sciences, California State Polytechnic College.

COATS, DONALD M. (1964).....Associate Dean, Educational Services
B.S., California State Polytechnic College, 1964; M.A., 1969.

Experience: Branch manager, Southern Pacific Milling Co., San Luis Obispo; sales representative and materials engineer, Walter B. Roselip Co., Atascadero; quality control inspector, Lindero Investment Co., San Luis Obispo; U. S. Navy; Admissions Officer, California State Polytechnic College.

COBB, ALAN W. (1964).....Chemistry
B.S., Oregon State University, 1932; M.S., 1934; Ph.D., University of Wisconsin, 1936; additional graduate study, University of Houston.

Experience: Chemist, Pan American Refinery, American Liberty Oil Company; self-owned drug stores, Texas City; teacher, Alvin College, Monterey Peninsula College; New Mexico Institute of Mining and Technology.

COCHRANE, MONA (1970).....Graduate Nurse
R.N., Knapp College of Nursing, Santa Barbara, California, 1953.

Experience: Clinic nursing, Orthopedic and Internal Medicine Specialty, San Luis Medical Clinic; ENT specialty nurse, Phoenix, Arizona; office assistant general surgery, Santa Barbara, California; industrial nursing, Miami Inspiration Copper Co., Miami, Arizona; general staff nurse, San Luis Obispo General Hospital, San Luis Obispo, California.

COCKRIEL, GEORGE W. (1957).....Chief Security Officer
Experience: Chief, Pacific Fire District, Sacramento; special agent, U.S. Army counterintelligence; investigator, office of the District Attorney, Reno, Nevada; instructor, fire safety and control, California Highway Patrol Academy, Sacramento.

COLLINS, RALPH C. (1955).....Education
B.S., Drake University, 1932; M.A., 1941; Ed.D., University of Colorado, 1951.

Experience: Officer and navigation instructor, U.S. Navy; physics instructor, East High School, Des Moines, Iowa; graduate assistant, Iowa State College and University of Colorado; head, Science Department, Eugene High School, Eugene, Oregon; assistant professor, Central Washington College of Education, Drake University, University of Oregon.

COMPTON, LUVENIA (1969).....Library
A.B., University of Kentucky, 1962; M.S.L.S., 1965; additional graduate study, Allan Hancock College, Temple Buell College.

Experience: Teacher, Floyd County Board of Education; claims adjuster, Social Security Administration; interviewer and office manager, U.S. Employment Service; teacher, Summit Elementary School; librarian, Norwalk High School and Lompoc Unified School District; district librarian, Rim-of-the-World Unified School District.

Faculty and Staff

- CONNELY, JOHN B. (1970)** Education
 B.A., University of Southern California, 1958; Ph.D., 1970.
 Experience: Foreign Service Officer, vice-consul, U.S. Department of State, Munich, Germany; lecturer, California State College at Los Angeles and California State Polytechnic College, Pomona; teacher and chairman of Social Studies Department, Gage Junior High School, Huntington Park.
- CONNER, E. WESLEY (1963)** Ornamental Horticulture
 B.S., California State Polytechnic College, 1956.
 Experience: Manager, Landscape Department, Yosemite Park & Curry Company; landscape consultant, Spencer & Lee, Architects, San Diego and Napa County; assistant to landscape architect, Huettig & Schromm, Palo Alto.
- CONWAY, JAMES R. (1970)** Speech
 B.A., California State College at Los Angeles, 1966; M.A., 1968; additional graduate study, University of Southern California.
 Experience: Instructor, San Fernando Valley State College; graduate assistant, California State College at Los Angeles.
- COOK, DAVID W. (1941)** Associate Dean, Curriculum and Instruction
 B.S., University of California, 1937.
 Experience: Examiner, Board of Fire Underwriters of the Pacific; engineer, Insurance Company of North America; instructor, electrical engineering and mathematics; coordinator of navigation instruction, U.S. Naval Flight Preparatory School; registrar; chairman, Mathematics Department, California State Polytechnic College.
- COOMBS, LEE CHARLES (1969)** Chemistry
 B.A., San Diego State College, 1963; M.S., 1965; Ph.D., Purdue University, 1970.
 Experience: Teaching assistant and spectroscopist, San Diego State College; instructor, Purdue University.
- COOPER, ALAN F. (1970)** Biological Sciences
 B.S., California State Polytechnic College, Pomona, 1964; Ph.D., University of California, Riverside, 1969.
 Experience: NDEA Fellowship, research assistant, postgraduate research nematologist, University of California, Riverside.
- COSMA, EARL J. (1967)** Food Industries
 B.S., California State Polytechnic College, 1965; M.S., New Mexico State University, 1967.
 Experience: U.S. Air Force; ranching; meat research and teaching assistant, New Mexico State University.
- COTA, HAROLD M. (1965)** Environmental Engineering
 B.S., University of California, 1959; M.S., Northwestern University, 1960; Ph.D., Oklahoma University, 1966.
 Experience: Graduate assistant, University of Oklahoma; research engineer, Lockheed Missiles; engineer, Westvaco (FMC).
- COYES, FRANK G. (1965)** Agricultural Engineering
 B.S., California State Polytechnic College, 1950; M.A., 1957.
 Experience: Instructor, Coalinga Union High School, Coalinga College.
- CRABTREE, HELEN S. (1970)** Home Economics
 B.S., California State Polytechnic College, San Luis Obispo, 1961; graduate study, California State Polytechnic College and University of California Extension.
 Experience: Counselor, Diablo Valley Area Girl Scouts; teacher, Templeton Unified Schools, Paso Robles Joint Union High School, Paso Robles and Atascadero Summer Schools.
- CRANE, FRANKLIN S. (1958)** Mechanical Engineering
 Petroleum Engineer, Colorado School of Mines, 1943; graduate study, Massachusetts Institute of Technology.
 Experience: Division engineer, Oil Well Supply Company; chief engineer, Martin-Decker Corporation; secretary-treasurer and director, Decker Engineering Corporation; officer, U.S. Navy; registered petroleum engineer, California.

Faculty and Staff

- CRESCIONE, B. JOSEPH (1970)**.....Architecture
 B. Arch., California State Polytechnic College, San Luis Obispo, 1970.
 Experience: Special Project and Civil Defense Coordinator, San Luis Obispo County; senior draftsman at various firms in the Los Angeles and Pismo Beach areas.
- CRUIKSHANKS, A. NORMAN (1947)**.....Social Sciences
 A.B., University of California, 1931; M.A., Stanford University, 1933; Ed.D., 1957; additional graduate study, University of London, University of Geneva, University of Paris.
 Experience: Instructor, California secondary schools; educational advisor, U.S. Department of Interior, CCC; director of adult education and community forums, Fort Bragg, California; tour director, Europe and the Middle East; head, Social Sciences Department, California State Polytechnic College.
- CULBERTSON, JAMES T. (1953)**.....Head, Philosophy Department
 A.B., Yale University, 1934; Ph.D., 1940; other graduate study, University of Pennsylvania.
 Experience: Research fellow, Yale University; professor, mathematics and physics, Cumberland University; head of mathematics department, Southwestern University; research associate mathematical biology, University of Chicago; assistant professor of philosophy, University of Southern California; research associate Rand Corporation; research psychologist, UCLA.
- CUMMINS, CARL C. (1958)** Dean, School of Human Development and Education
 A.B., University of California, Santa Barbara, 1948; M.S., University of Southern California, 1952; Ed.D., University of California, 1957.
 Experience: Construction supervisor, National Shipbuilding Corporation, San Diego; plant engineer, Ryan Aeronautical Co.; professor, San Diego State College; engineer, General Electric Company.
- CUNNINGHAM, WALTER M. (1969)**.....Social Sciences
 B.A., Los Angeles State College, 1962; M.A., 1964; Ph.D., Claremont Graduate School and University Center, 1968.
 Experience: Special districts officer, Los Angeles County Administration; lecturer, California State College, Fullerton and Los Angeles State College; assistant professor, Fresno State College, California State College, Los Angeles.
- CURTIS, CHARLES D. (1968)**.....Mathematics
 A.B., San Diego State, 1965; M.S., 1967; additional study, University of California, Santa Barbara.
 Experience: Teaching assistant, San Diego State College; research assistant, University of California, Santa Barbara.
- CURTIS, DONALD J. (1960)**.....Senior Clinical Laboratory Technologist
 R.N., Hospital Corps, Medical Department, U.S. Navy.
 Experience: Chief warrant officer, USN; nursing and laboratory service, USNH; laboratory service, USNH, Pearl Harbor; personnel and medical records, USNH; Epidemiology Control Units, Pearl Harbor; administrative officer, Fourth Marine Division; assistant medical property and accounting officer, Camp Pendleton; clinical laboratory technologist, Patton State Hospital; senior clinical laboratory technologist, Atascadero State Hospital.
- CURTIS, WILLIAM D. (1961)**.....Psychology
 B.A., University of Redlands, 1948; M.A., University of California, Los Angeles, 1951; Ph.D., University of Denver, 1960.
 Experience: Probation officer, Riverside County, California; school psychometrist, San Bernardino City Schools; teacher, San Bernardino High School; instructor, San Bernardino Valley College; part-time instructor, University of Redlands, University of Denver, International Business Machines Corporation.
- CURZON, GORDON (1970)**.....English
 B.S., DePaul University, 1941; B.A., St. Mary's College, 1945; M.A., Western Washington State College, 1966; Ph.D., University of California, Riverside, 1969.
 Experience: Research chemist, industrial editor, Georgia-Pacific Corporation; teaching assistant, University of California, Riverside; instructor, College of the Desert.

Faculty and Staff

- D'ALBRO, JAMES A. (1969)** Ornamental Horticulture
B.S., Cornell University, N.Y., 1966; M.S., University of California, Davis, 1969.
Experience: Part-time county agricultural agent, commercial greenhouse worker; Research Assistant, University of California, Davis; General Production Manager, commercial cut flowers, Goro Kawai, Inc., Salinas, California.
- DARLAND, GARY KENT (1970)** Biological Sciences
B.S., University of Washington, 1964; M.S., 1966; Ph.D., 1969.
Experience: Research associate, Department of Microbiology, Indiana University.
- DARNIELLE, MAX E. (1967)** English
B.S., University of Oregon, 1950; M.S., Indiana University, 1967; additional graduate study, Indiana University.
Experience: Teacher, South San Francisco, Oakland, Cincinnati, Columbus; teaching assistant, university fellow, Indiana University.
- DATTA, SAMIR KUMAR (1968)** Electrical Engineering
B.E.E., Jadavpur University, Calcutta, India, 1958; M.S., University of Manchester, England, 1963; Ph.D. 1966.
Experience: Graduate Trainee, Askania-Werke, West Berlin, Germany; engineer Valvo GMBH, Hamburg, W. Germany; demonstrator, University of Manchester, England; application engineer, General Electric Company, New York; systems engineer, General Electric Company, Pennsylvania.
- DAVIDSON, HAROLD P. (1936)** Head, Music Department
B.A., Pomona College, 1929; M.A., Claremont College, 1932; additional graduate study, University of Southern California.
Experience: Head of Music Department, Emerson Junior High School, Pomona; master training teacher, Claremont College.
- DAVIDSON, OTTO C. (1968)** Mechanical Engineering
B.S., Bucknell University, 1955; M.S., Massachusetts Institute of Technology, 1956; Ph.D., Stanford University, 1960.
Experience: Assistant professor, University of Utah, Robert College; officer, U.S. Army; engineer, various engineering firms in New York, Utah, California.
- DAVIES, GEORGE R., II (1962)** Admissions Officer
B.S., University of Pittsburgh, 1939; Command and General Staff College, 1960.
Experience: Assistant professor of military science, California State Polytechnic College; assistant professor of military science, Valley Forge Military Academy; training officer, 1st Guided Missile Group, Fort Bliss; executive officer and battalion commander, Fifth Howitzer Battalion, Korea.
- DAVIS, CHARLES P. (1958)** Head, Aeronautical Engineering Department
B.S., Rensselaer Polytechnic Institute, 1948.
Experience: Instructor and assistant professor, Rensselaer Polytechnic Institute; development engineering and product engineer leader, General Electric Company.
- DEAN, ARNOLD M. (1949)** Soil Science
B.S., University of Alberta, Canada, 1943; M.S., 1946; Ph.D., University of Wisconsin, 1949.
Experience: Laboratory assistant, Dominion Department of Agriculture, Edmonton, Alberta; teaching assistant, University of Wisconsin; industrial fellowship, University of Wisconsin.
- DEASE, CLYDE G. (1970)** Physics
B.S., Purdue University, 1961; M.S., University of Michigan, 1962; Ph.D., The George Washington University, 1969.
Experience: Instructor, U.S. Army, Redstone Arsenal, Alabama; research assistant, University of Michigan Office of Research Administration; physicist, Melpar, Inc., Falls Church, Virginia and Kaman Sciences Corporation, Tucson, Arizona; instructor, The George Washington University.
- DELANY, JAMES E. (1970)** Mathematics
A.B., San Diego State College, 1961; Ph.D., Iowa State University, 1966.
Experience: Graduate assistant, Iowa State University; assistant professor, University of California, Irvine.

Faculty and Staff

DELVAGLIO, PETER A. (1970) Graphic Communications
B.S., Rochester Institute of Technology, 1963; graduate study, Bridgeport University.

Experience: Graphic arts salesman, Darien Review, Connecticut; printing liaison, information specialist, U.S. Army, Vicenza, Italy; production control, Northwest Publishing, Connecticut; instructor, Stamford school system, Connecticut.

DEMPSEY, PAUL L. (1970) Business Administration
B.B.A., University of Miami, 1951; J.D., 1956; L.L.M., New York University, 1958.

Experience: Editor, Prentice-Hall, Inc., New Jersey; attorney, Miami; legal staff, American Telegraph & Telephone Co., New York; chief counsel, New York State Senate Judiciary Committee; real estate broker.

DETTLOFF, ERLAND G. (1967) Education
B.S., Minor State College, 1956; M.A. University of Wyoming, 1962; Ed.D., 1963.

Experience: Teacher, Great Falls, Montana; visiting professor, part-time instructor, assistant professor, University of Wyoming; assistant professor, Northern State College, South Dakota.

DE VOROS, EVELYN K. (1955) Speech
B.A., University of Texas, 1936; M.A., University of Michigan, 1941; Ph.D., University of Michigan, 1945.

Experience: Instructor in Texas Public Schools; instructor, Louisiana Polytechnic Institute; assistant professor, Bowling Green State University, Ohio, University of California, Santa Barbara College.

DICKEY, RICHARD K. (1956) Electrical Engineering
B.S., University of California, 1948; M.S., 1956; Ph.D., University of California, Santa Barbara, 1969.

Experience: Project engineer, Berkeley Scientific Co.; design engineer, Remler Co., Ltd.; engineer, Alameda Naval Air Station. Registered professional engineer, California.

DICKINSON, ROBERT W. (1970) Education
B.A., Stanford University, 1933; M.A., University of California at Los Angeles, 1950; Ed.D., 1969.

Experience: Junior high teacher, Long Beach Unified School District; elementary teacher, elementary principal, Director of Educational Services, assistant superintendent-instruction, Palos Verdes School District; district superintendent, La Verne City School District, Bonita Unified School District.

DICKSON, BRUCE A. (1952) Soil Science
B.S.A., University of British Columbia, Canada, 1940; M.S.A., 1942; Ph.D., University of California, Berkeley, 1952.

Experience: Teaching assistant, University of British Columbia; teaching assistant, University of California at Berkeley; assistant in plant nutrition, Dominion Experimental Station, Saanichton, B.C.; soil specialist; Dominion Experimental Farm, Agassiz, B.C.

DILLS, CHARLES E. (1963) Chemistry
B.S., North Dakota State University, 1949; M.S., George Washington University, 1951; Ph.D., Harvard University, 1956; additional graduate study, Columbia University.

Experience: Professor, Deep Springs College; assistant editor, American Chemical Society; chemist, National Research Corporation; assistant professor, Northwest Missouri State College.

DILTS, RALPH W. (1944) History
A.B., Montana State University, 1936; M.A., 1938; additional graduate study, University of California, 1940-41.

Experience: Stevensville High School, Stevensville, Montana; graduate assistant, Montana State University; graduate assistant, University of California; U.S. Bureau of Reclamation.

Faculty and Staff

- DOCTOR, JAN** (1969).....Environmental Engineering
B.S., University of Alberta, 1964; M.S., California Institute of Technology, 1965.
Experience: Consulting engineer and project engineer, I.B.M. Corporation, San Jose; facilities design engineer, Ampex Corporation; mechanical engineer, Fairchild Semiconductor. Registered professional engineer, Alberta and Saskatchewan.
- DONALDSON, DOUGLAS D.** (1968).....Biological Sciences
A.B., University of California, Berkeley, 1962; M.A., California State College, Los Angeles, 1964; Ph.D., Oklahoma State University, 1969.
Experience: Herbarium assistant, University of California, Berkeley; unit fellow, Oklahoma Cooperative Wildlife Research Unit, Oklahoma State University; instructor and assistant professor, California State College, Los Angeles.
- DONALDSON, ELLEN J.** (1969).....Graduate Nurse
R.N., Santa Clara County Hospital, San Jose, 1951; B.A., San Jose State College, 1952.
Experience: Paso Robles War Memorial Hospital; Sierra Vista Hospital; Public Health Department; French Hospital; General Hospital, San Luis Obispo.
- DONOHUE, CHARLES A.** (1969).....Business Administration
B.S., University of California, Berkeley, 1941; M.S., University of Pittsburgh, 1952.
Experience: Budget and fiscal officer/resident auditor, USAF; staff accounting officer, Hq. USAF, Washington, D.C.; director of accounting and finance, Hq. Fifth Air Force, Tokyo; chief, systems division, Air Force Accounting and Finance Center, Denver; comptroller, Osan Air Base, Korea; and Air Force Western Test Range, Vandenberg AFB.
- DOPP, JAMES W.** (1969).....Library
A.B., Franklin and Marshall College, 1965; M.S.L., Western Michigan University, 1966.
Experience: Cataloger, Detroit Public Library.
- DOURSON, ROBERT H.** (1967).....Computer Science and Statistics
B.S., California Institute of Technology, 1935; M.S., 1941; Ch.E., 1942; additional graduate study, Case Institute of Technology, Southern Illinois University.
Experience: Laboratory chemist, research chemical engineer, Union Oil Company; research chemist, Cutter Laboratories; laboratory assistant, California Technology; various engineering and administrative positions, Shell Oil Company.
- DRAVES, ALBERT W.** (1969).....Architecture
B.S., Purdue University, 1948; B.S., Rensselaer Polytechnic Institute, 1952; M.B.A., Roosevelt University, 1962.
Experience: Civil Engineer Corps, U.S. Navy; director, operational development, Rex Chainbelt, Inc.; manager, Industrial Building Design Division, De Leuw, Cather & Co., Chicago; instructor, Purdue University. Registered professional civil and mechanical engineer, New York, Louisiana, Indiana, Illinois, California.
- DUARTE, ARTHUR C.** (1967).....Agricultural Management
B.S., California State Polytechnic College, 1964; M.S. Oregon State University, 1965.
Experience: Farming.
- DUNDON, STANISLAUS J.** (1970).....Philosophy
B.A., Mt. Carmel College, 1962; M.A., St. John's University, 1965; additional graduate study, St. John's University, Boston University, University of California.
Experience: Teaching fellow, St. John's University; lecturer, University of Santa Clara; consultant, Brasch-Newton Collection in History of Scientific Thought, Stanford University Libraries.
- DUNIGAN, LOWELL H.** (1961).....Director, Institutional Research
B.S., Iowa State University, 1947; M.S., 1948; additional graduate study, University of Southern California.
Experience: Officer, U.S. Navy; instructor in sociology, Iowa State University; claims adjuster, Employers Mutuals Insurance Company; research technician, California Highway Planning Survey; research technician, California State Department of Education, Division of State Colleges and Teacher Education.

Faculty and Staff

- DUNN, JOHN E. (1961)**.....Agricultural Engineering
B.S., Oregon State University, 1943; M.A., California State Polytechnic College, 1967; M.S., University of Hawaii, 1970.
Experience: Engineering officer, USNR; service supervisor, wholesale farm machinery, Los Angeles, and retail farm machinery, Bakersfield, Calif., and Yuma, Arizona; instructor, California State Polytechnic College.
- DUNN, WESLEY T. (1959)**.....Graphic Communications
Experience: Instructor, Compton High School; rotary press operator, Moore Business Forms; 11 years experience as composition-press operator for various printing firms.
- DUSEK, BERNARD W. (1965)**.....Art
A.B., University of California, 1951; M.A., University of Southern California, 1955.
Experience: Instructor, Bellflower Unified School District, Fullerton Junior College, Palomar Junior College.
- DUVALL, WILLIAM E. (1970)**.....History
B.A., Whitworth College, 1965; M.A., University of Pennsylvania, 1967; additional graduate study, University of California.
Experience: Associate, University of California, Santa Barbara; instructor, Community College of Philadelphia.
- EASTHAM, GEORGE M. (1966)**.....Economics
B.A., Chico State College, 1961; M.A., University of California, Santa Barbara, 1965; additional graduate study, University of California.
Experience: Revenue officer, Internal Revenue Service; teaching assistant and research assistant, University of California, Santa Barbara.
- EATOUGH, NORMAN L. (1968)**.....Chemistry
B.S., Brigham Young University, 1947; B.E.S., 1958; M.S., 1959; M.S.Ch.E., 1960, Ph.D., 1968.
Experience: Senior development engineer, Hercules Powder Company; assistant professor, Dixie Junior College; instructor, Brigham Young University.
- EDMISTEN, JOHN W. (1968)**.....Architecture
B.S. Arch. Engr., California State Polytechnic College, 1965; M.Engr., University of California, Berkeley, 1967.
Experience: Teaching assistant, University of California, Berkeley; project engineer-designer, Reid & Tarics, Architects and Engineers; draftsman, Kenneth Vinolia, Structural Engineer; designer-draftsman, Walter Constant, Structural Engineer.
- EGENHOFF, FRANK C., JR. (1967)**.....Men's Physical Education
B.S., University of Nevada, 1965; M.A., California State Polytechnic College, 1966; additional graduate study, University of Iowa.
Experience: Student trainer, track coach, University of Nevada, California State Polytechnic College; part-time instructor, track and field coach, graduate assistant, University of Iowa.
- EILERS, PATRICIA (1956)**.....Graduate Nurse
R.N., San Diego County Hospital, 1936.
Experience: San Luis Obispo County General Hospital.
- ELLIOTT, WALTER E. (1965)**.....Physics
B.S., McNeese State College of Louisiana, 1954; M.Ed., Northwestern State College of Louisiana, 1957; M.S., 1963.
Experience: Teaching fellow, Northwestern State College of Louisiana; assistant professor of physics and mathematics, Springfield College; U.S. Navy.
- ELSTON, CHARLES A. (1947)**.....Mathematics
A.B., Santa Barbara State College, 1932; M.S., University of Southern California, 1940; additional graduate study, University of Southern California.
Experience: Teacher, Santa Barbara County Schools; instructor, head, Mathematics, Junior High School and Adult Evening School, San Luis Obispo; surveyor, U.S.E.D. and Southern Pacific Railroad.

Faculty and Staff

- ELTZROTH, THOMAS E.**.....Ornamental Horticulture
 B.S., The Ohio State University, 1965; M.S., 1966.
 Experience: Research fellow, The Ohio State University.
- EMMEL, JAMES R. (1967)**.....Head, Speech Department
 B.A., Eastern Nazarene College, 1945; Speech Therapy Certification, Northwestern University, 1946; M.A., University of Oklahoma, 1950; Ph.D., Pennsylvania State University, 1959.
 Experience: Chairman, Department of Speech, Bethany Nazarene College; part-time instructor, Pennsylvania State University; speech consultant, U.S. Dependent Schools, Germany; chairman, Division of Letters, full professor of speech, Pasadena College.
- EMMONS, MICHAEL L. (1968)**.....Counselor
 B.S., Illinois State University, 1963; M.S., 1964; Ph.D., University of Wyoming, 1968.
 Experience: Graduate assistant, Counseling Center, University of Wyoming; counselor-teacher, Palatine High School, Illinois; residence hall counselor, Illinois State University; U.S. Navy.
- ENDRES, LELAND S. (1969)**.....Chemistry
 A.B., Middlebury College, 1958; M.A., University of Oregon, 1963; Ph.D., University of Arizona, 1966.
 Experience: Research and teaching assistant, University of Oregon, University of Arizona; research associate, instructor, University of Nebraska; senior research chemist, 3M Company.
- ENRIQUEZ, JUDITH K. (1970)**.....Graduate Nurse
 R.N., St. Elizabeth School of Nursing, Yakima, Washington, 1968.
 Experience: Staff nurse, St. Elizabeth Hospital; office nurse, Sacramento, California; diagnostic radiology nurse, UCLA Health Center.
- EPPLEY, RICHARD K. (1969)**.....Biological Sciences
 B.A., San Jose State College, 1957; M.S., Oregon State University, 1963; additional graduate study.
 Experience: Assistant sales representative and territory manager, Niagara Chemical Division; survey entomologist and assistant extension state entomologist, Oregon State Department of Agriculture and U.S. Department of Agriculture; teaching and research assistant and instructor, Oregon State University; instructor, Eastern New Mexico University.
- EPSTEIN, GARY M. (1969)**.....Mathematics
 B.A., University of California at Riverside, 1964; Ph.D., 1969.
 Experience: Research assistant, Riverside Cement Co., University of California, Riverside.
- ERICSON, JON M. (1970)**.....Dean, School of Communicative Arts and Humanities
 B.A., Pacific Lutheran College, 1952; M.A., Stanford University, 1953; Ph.D., 1961.
 Experience: Professor and head of Department of Speech and Drama, Central Washington State College; assistant professor and Director of Forensics, Stanford University; assistant professor, Pacific Lutheran College; instructor, Texas Lutheran College.
- ERNATT, EDWARD J. (1958)**.....Education
 A.B., Wayne State University, 1946; M.Ed., 1950; Ed.D., University of Michigan, 1956.
 Experience: Elementary schoolteacher, Taylor Center Schools, Inkster, Michigan; district superintendent, Nankin-Dearborn Schools, Inkster, Michigan; elementary schoolteacher, Santa Barbara, California; supervising teacher, University of California, Santa Barbara College; district superintendent, West Park School District, Fresno, California.

Faculty and Staff

EVANS, BERNARD B. (1970).....Computer Science and Statistics
B.A., Long Beach State College, 1959; M.S., Kansas State University, 1962; Ph.D., Purdue University, 1964.

Experience: Member of technical staff, Space Technology Laboratories; research assistant, Kansas State University; research associate, Purdue University; member of technical staff, Aerospace Corporation; advisory engineer, IBM; senior staff engineer, Geodynamics Corporation.

EVANS, HAROLD D. (1965).....English
B.A., Duke University, 1949; M.A., Columbia University, 1956; additional graduate study, Columbia University.

Experience: Instructor, Fairfax Public Schools, South Carolina; public information specialist, U.S. Air Force; instructor, McBurney School, New York City; registrar for graduate faculties, Columbia University; free-lance writer; research and writing, U.S. Office of Education; instructor, Texas Western College; lecturer, American University, Washington, D.C.; assistant professor, St. Andrews College, Laurinburg, North Carolina.

EVANS, J. HANDEL (1970).....Architecture
Diploma of Architecture, University of Manchester, England, 1965; M. Arch., University of Oregon, 1967; additional graduate study, University of Cambridge, England.

Experience: Lecturer, California State Polytechnic College, San Luis Obispo; research assistant, Bureau of Municipal Research, Oregon; teaching assistant, University of Oregon; design architect, R. Seisert, Architects; senior assistant architect, Ytipe & Wakeham. Registered architect, England.

EYLER, MARY F. (1960).....Financial Aid Counselor
B.S., Western Michigan University, 1959; graduate study, California State Polytechnic College.

Experience: Secretary, Simplex Paper Corporation, Adrian, Michigan; Ford Motor Company, Dearborn, Michigan; intermediate stenographer; placement interviewer and Placement Supervisor, California State Polytechnic College; business teacher, San Luis Obispo Adult Evening School.

FABRICIUS, EUGENE DAVID (1970).....Electronic Engineering
B.S., Missouri School of Mines, Rolla, 1956; M.S., 1958; D.Sc., Newark College of Engineering, New Jersey, 1968.

Experience: Associate professor, Rochester Institute of Technology, Rochester, New York; assistant professor, Newark College of Engineering, New Jersey; National Science Foundation Faculty Fellow; senior physicist, Giannini Controls Corporation, Pasadena, California; development engineer, Texas Instruments, Inc., Dallas, Texas; instructor, Texas A. & M., College Station, Texas.

FALKENSTERN, OSWALD J. (1953).....Mathematics
B.S., Montana State College, 1939; M.S., San Jose State College, 1952; additional graduate study, University of Colorado, Colorado A & M College.

Experience: High school teacher and coach, Baker and Opheim, Montana; air navigation officer, U.S. Navy; mathematics instructor, Colorado A. & M. College; instructor and chairman of junior high school mathematics, Salinas.

FARR, VINCENT P. (1970).....Foreign Language and Linguistics
B.A., San Francisco State College, 1964; M.A., 1966; additional graduate study, Universidad de Barcelona, Spain, University of California.

Experience: Associate, University of California, Santa Barbara; teacher, Santa Barbara City College, Mission High School, San Francisco; instructor-director, Farr School of Languages, Canada.

FARRELL, GERALD P. (1970).....Mathematics
A.B., San Diego State College, 1961; M.S., 1963; Ph.D., University of California, Los Angeles, 1968.

Experience: Research assistant, University of California, Los Angeles; assistant professor, California State College, Los Angeles, and Hawaii Loa College, Honolulu.

Faculty and Staff

- FARRELL, WARREN S. (1967)**.....Agricultural Management
 B.S., California State Polytechnic College, 1963; M.S. University of California, Davis, 1964; Ph.D., 1968.
 Experience: Research assistant, Department of Agricultural Economics, University of California, Davis.
- FEDERER, M. DALE (1963)**.....Psychology
 B.S., University of Wyoming, 1961; M.Ed., 1961; Ph.D., 1962.
 Experience: Officer, U.S. Army; instructor, Saratoga School District, Wyoming; assistant instructor, extension instructor and assistant professor, University of Wyoming.
- FENNEMA, FREDERICK F. (1970)**.....Industrial Engineering
 B.S., Oklahoma State University, Stillwater, Oklahoma, 1941; M.S., 1962; Ph.D., 1964.
 Experience: Civilian operations analysis, U.S. Air Force; technical director plans and requirements, National Range Division (Global Launch Range); deputy chief operations analysis, Military Airlift Command; professor, chairman Operations Research Department, Dean of Graduate School, Florida Institute of Technology.
- FETTERS, MERTON D. (1970)**.....Veterinary Science
 D.V.M., University of Minnesota, 1952; Ph.D., University of California, 1970.
 Experience: Mixed veterinary practice, Newton, Iowa; dairy cattle practice, Moose-Lake, Minnesota.
- FIERSTINE, HARRY L. (1966)**.....Biological Sciences
 B.S., Long Beach State College, 1957; M.A., University of California, Los Angeles, 1961; Ph.D., 1965.
 Experience: Student assistant, Los Angeles County Museum; teaching and research assistant, cardio-vascular trainee, University of California, Los Angeles; instructor, Long Beach State College.
- FINCH, HARRY C. (1962)**.....Biological Sciences
 B.S., Iowa State University, 1946; M.S., 1947; Ph.D., 1950.
 Experience: Instructor, Iowa State University; research associate, Iowa State University; assistant professor, North Carolina State College, Agricultural Experiment Station; associate professor, Pennsylvania State University; project leader, fungicide and nematocide research, Monsanto Chemical Company, St. Louis, Missouri.
- FISHER, CLYDE P. (1947)**.....Dean, School of Science and Mathematics
 A.B., University of Oklahoma, 1942; M.A., University of Southern California, 1947; Ph.D., 1955.
 Experience: Teaching assistant in mathematics, lecturer in mathematics, University of Southern California; officer, U.S. Army; instructor, mathematics; assistant to the dean, Liberal Arts Division; assistant to the executive dean; building program co-ordinator, executive secretary to the President's Cabinet; supervisor of Special Studies Staff; Dean, Educational Services and Curriculum Development; Dean of the College, California State Polytechnic College.
- FITTS, JAMES L. (1967)**.....History
 A.B., Seattle University, 1950; M.A., University of Washington, 1951; Ph.D., University of California, Los Angeles, 1970.
 Experience: Teacher, All Hallow's High School; claims supervisor, Social Security Administration; assistant professor, Immaculate Heart College, San Fernando Valley State College.
- FLAKE, GERRY R. (1969)**.....Agricultural Management
 B.S., Arizona State University, 1966; M.S., Utah State University, 1967.
 Experience: Research assistant, Utah State University; assistant manager, Southwestern Regional Commodity Buying Office, Ralston Purina Company, Fort Worth, Texas; ranching, northern Arizona.
- FLANAGAN, JAMES ROBERT (1959)**.....Animal Science
 B.S., California State Polytechnic College, 1959.
 Experience: Rancher.

Faculty and Staff

FOLSOM, VOLMAR A. (1946).....Mathematics
B.S., Iowa State College, 1934; M.E., Colorado University, 1937; additional graduate study, Southern Methodist University.

Experience: High school and junior college teaching; officer, U. S. Navy; assistant professor, mathematics, Southern Methodist University; coordinator, relations with schools, California State Polytechnic College.

FOTTER, MILLARD J. (1954).....Industrial Engineering
B.S., Armour Institute of Technology, 1935; M.S., University of Southern California, 1956.

Experience: Officer, U. S. Air Force; sales engineer, Stanley E. Morris Co., Los Angeles; production engineer, Southland Paper Co., Los Angeles; industrial engineer, Southwestern Engineering Co., Los Angeles; industrial engineer, International Harvester Co., Chicago and Memphis. Registered professional engineer, California.

FOUNTAIN, H. PAUL (1965).....Crops Science
B.S., California State Polytechnic College, 1963.

Experience: Orchard manager, Ballico, California; agriculture inspector, Santa Barbara County.

FOWLER, ANNE C. (1965).....Social Sciences
B.A., Douglass College, 1939; M.A., Vanderbilt University, 1959; Ph.D., Tulane University, 1970.

Experience: Assistant professor, Nevada Southern University; assistant research sociologist, Council of Social Agencies, New Orleans; research sociologist, Charity Hospital, New Orleans.

FOX, FRANK W. (1957).....Animal Science
B.S., California State Polytechnic College, 1951; M.A., 1957.

Experience: Director of vocational agriculture, Lassen Union High School, Susanville.

FREY, DENNIS F. (1970).....Biological Sciences
B.S., Oklahoma State University, 1963; M.S., Virginia State College, 1967; Ph.D., Oklahoma State University, 1970.

Experience: Instructor in biology, Classen High School, Oklahoma City Public School District; teaching and research assistant, Oklahoma State University.

FREY, THOMAS G. (1970).....Chemistry
B.A., University of Oregon, 1965; Ph.D., University of Idaho, 1970.

Experience: Technician, University of Oregon; technician, analyst and teaching assistant, University of Idaho.

FREITAG, FREEMAN (1966).....Electronic Engineering
B.S., Arizona State University, 1963; M.S., 1965.

Experience: Engineer, Motorola Semiconductors, Bell Aero Systems.

FRETWELL, DAVID H. (1969).....Industrial Technology
B.Ed., University of Alberta, 1963; M.Ed., Oregon State University, 1969; additional graduate study, Oregon State University.

Experience: Plot worker, Dominion Experimental Station, Lacombe, Alberta, Canada; shop instructor, Vulcan County Schools and Calgary School Division, Alberta; service representative, Ford of Canada, Edmonton, Alberta; shop instructor, Edmonton Public Schools, Alberta; graduate assistant, Oregon State University.

FRIEND, KATHLEEN D. (1970).....Home Economics
B.S., Northern Illinois University, 1967; M.S., Ohio State University, 1968.

Experience: Trainee, Carson, Pirie & Scott, Chicago; clothing and textile instructor, Western Illinois University; art teacher, Marion Community Schools, Indiana.

Faculty and Staff

- FRIETZSCHE, ARTHUR H. (1965)** English
 B.A., University of California, 1944; M.A., 1945; Ph.D., 1949.
 Experience: Teaching assistant, lecturer, University of California; supervisor, technical publications, General Electric Company; associate professor, Utah State University.
- FROGGATT, CLARA B. (1964)** Psychometrist
 B.A., University of Wyoming, 1940; M.A., California State Polytechnic College, 1968.
 Experience: Teacher, Secondary School, Wyoming; personnel department, United Air Lines.
- FROST, JACK D. (1969)** Industrial Technology
 B.S., Arizona State University, 1959.
 Experience: Development engineer, Airesearch Mfg. Co., Phoenix, Arizona; associate professor, Oregon Technical Institute; senior research engineer, Lockheed Missile and Space Co.; lecturer, South Australian Institute of Technology; project engineer, General Motors, Woodville, South Australia; senior research engineer, Lockheed Missile and Space Company.
- FROST, ROBERT H. (1953)** Head, Physics Department
 A.B., University of California, 1939; M.A., 1945; Ph.D., 1947.
 Experience: Teaching assistant, University of California; assistant professor, University of Missouri.
- FULLER, KENNETH G. (1960)** Computer Science & Statistics
 A.B., Indiana University, 1925; A.M., University of Nebraska, 1927; Ph.D., Columbia University, 1948.
 Experience: Instructor of mathematics, Northwestern University, Brown University, Long Island University, The College of the City of New York; officer and instructor, U. S. Military Academy; professor and chairman, mathematics department, Central Connecticut State College.
- FURIMSKY, GEORGE S. (1955)** Engineering Technology
 B.S., Bradley University, 1949; M.S., 1950.
 Experience: Instructor, Peoria Manual Training High School; graduate assistant, Bradley University; superintendent, buildings and grounds, Blackburn College; instructor and chairman, Department of Technology, Evelyn Hone College of Further Education, Lusaka, Zambia, for U.S. Agency for International Development.
- GALVEZ, CONNIE J. (1970)** Graduate Nurse
 B.S., Fresno State College, 1968.
 Experience: Staff nurse, Arroyo Grande Hospital and San Leandro Community Hospital; Visiting Nurses Association of Northern Santa Barbara County; public health nurse, Alameda County Children and Youth Project.
- GANG, DONNA D. (1967)** Graduate Nurse
 R.N., Regina General Hospital, Saskatchewan; additional studies, Jersey City Medical Center, Greystone Park, New Jersey.
 Experience: Regina General Hospital, Morristown Memorial Hospital, New Jersey; Weyburn Union Hospital, Saskatchewan; Sierra Vista Hospital, San Luis Obispo.
- GARNER, EDWARD R. (1967)** Mechanical Engineering
 B.S., Bradley University, 1962; M.S., University of Arizona, 1965.
 Experience: Instructor, Rose Polytechnic Institute; graduate assistant, University of Arizona; mechanic, Groskorth Marine.
- GARRIDO, AUGUST E. (1969)** Men's Physical Education
 B.A., Fresno State College, 1961; M.S., California State Polytechnic College, 1969.
 Experience: Assistant professor, San Francisco State College; teacher and coach, Sierra Union High School, Tollhouse; player, Cleveland Indians.

Faculty and Staff

GASKIN, TIMOTHY A. (1970).....Ornamental Horticulture
B.S., University of California, 1954; M.S., University of Delaware, 1956; Ph.D., Purdue University, 1958; M.B.A., Ohio State University, 1968.

Experience: Plant breeder, Asgrow Seed Co., New Haven, Connecticut; Turf-grass Improvement and Research, Warren's Turf Nursery, Palos Park, Illinois; pesticide development and turf research, O. M. Scotts & Sons, Marysville, Ohio.

GATES, VINCENT J. (1958).....Journalism
B.S., University of Oregon, 1939; graduate study, Sacramento State College.

Experience: Editorial positions on daily newspapers in San Francisco, San Jose, Santa Rosa, Salinas; industrial editorial positions, Henry J. Kaiser Industries; public relations and press positions, U. S. Navy, California State Employees Association, California State Polytechnic College.

GEDAYLOO, TEYMOOR (1965).....Physics

B.A., Macalester College, 1957; M.S., University of Washington, 1959; additional graduate study, University of Washington.

Experience: Laboratory assistant, chief laboratory supervisor, University of Washington; instructor, Lawrence College; teacher and research associate, Argonne National Laboratory.

GENEREUX, DOUGLAS G. (1970).....Agricultural Management

B.S., University of Nebraska, 1964; M.S., University of Nebraska, 1969.

Experience: Economic research associate for Management Research Associates, Corvallis, Oregon; administrative assistant to dean of international programs, and graduate assistant, Department of Agriculture Education, University of Nebraska, Lincoln; instructor, Nehawka Consolidated Schools, Nehawka, Nebraska.

GENTHNER, FREDERICK L. (1952).....Library

B.A., Ohio Wesleyan, 1940; B.S. in L.S., George Peabody, 1941; A.M.L.S., University of Michigan, 1950.

Experience: Periodicals librarian, Ball State Teachers College; officer, U. S. Army; assistant reference librarian, Ohio State University.

GEORGE, DAVID L. (1970).....Social Sciences

A.B., San Diego State College, 1962; M.A., 1968; Ph.D., University of Oregon, 1970; additional graduate study, University of Michigan Survey Research Center.

Experience: Sales management, Campbell Soup Company; teaching assistant, San Diego State College; teaching and research assistant, University of Oregon.

GERALD, CURTIS F. (1964).....Head, Computer Science & Statistics

B.S., Iowa State University, 1936; M.S., University of Cincinnati, 1938; Sc.D., Massachusetts Institute of Technology, 1941; additional graduate study, University of Chicago Evening School.

Experience: Graduate assistant, University of Cincinnati, Massachusetts Institute of Technology; research fellow, Massachusetts Institute of Technology; research engineer, supervising research chemist, Universal Oil Products Co.; assistant professor, University of Washington; associate director of research, El Paso Natural Gas Products Co. Registered professional engineer, Illinois.

GERARD, E. DOUGLAS (1951).....Executive Dean

B.S., University of British Columbia, 1950; M.S., University of Saskatchewan, 1951.

Experience: Instructor, University of British Columbia; instructor, University of Saskatchewan; shop superintendent, British Columbia Forest Products, Pitt Lake, British Columbia; service manager, Tractor and Allied Equipment, Limited, Mel-fort, Saskatchewan.

GERNERT, ALEX M. (1969).....Electronic Engineering

B.S., Cooper Union School of Engineering & Science, 1967; M.S., Stanford University, 1968.

Experience: Technical staff, Bell Telephone Laboratories, New Jersey.

Faculty and Staff

- GERSTEN, CAROLYN J. (1967)**.....Counselor
 B.A., Sacramento State College, 1965; additional study, Sacramento State College.
 Experience: Psychiatric social worker, intake case worker, adult services, Sacramento County; instructor, English Language Department, Hokusei Gakuen, Sapporo, Hokkaido, Japan; administrative assistant, U.S. Civil Service Commission and Personnel, U.S. Air Force.
- GERSTEN, ROY (1967)**.....Business Manager, Associated Students, Inc.
 B.S., Sacramento State College, 1966; graduate study, Sacramento State College.
 Experience: Staff adviser, Presidential Communications, White House Communications Agency, The White House. Officer, U.S. Army.
- GIBFORD, WILLIAM R. (1955)**.....Animal Science
 B.S., California State Polytechnic College, 1947.
 Experience: Horse trainer, Ed Wright Stables and 1001 Ranch, Riverside; horse trainer and horseshoer, San Luis Obispo; employee, Humphrey Meat Packing Company, San Miguel; Pacific Valley Cattle Company, King City; U.S. Marine Corps.
- GIBSON, J. CORDNER (1949)**.....Dean, School of Agriculture
 and Natural Resources
 B.S., University of California, 1937; M.S., University of Southern California, 1955.
 Experience: Director of vocational agriculture, Downey and Whittier Union High Schools; U.S. Army; regional supervisor, Bureau of Agricultural Education; Dean, Student Personnel and Business Management, California State Polytechnic College, Kellogg-Voorhis.
- GILBERTSON, OSMUND S. (1968)**.....Agricultural Education
 B.S., University of Minnesota, 1958; M.A., 1966; additional graduate study.
 Experience: Director of agriculture and supervising teacher, St. Charles Consolidated High School, Minnesota; instructor, agricultural education and international programs manager, University of Minnesota.
- GLASS, L. JOE (1970)**.....Agricultural Engineering
 B.S., Purdue University, 1962; M.S., Texas A&M University, 1965; Ph.D., 1971.
 Experience: Engineering aid and student trainee, Soil Conservation Service, Lafayette, Indiana; graduate assistant, instructor, Texas A. & M. University.
- GLASSCO, D. EDWARD (1968)**.....Mathematics
 B.S., Harvey Judd College, 1963; M.A., University of California, Los Angeles, 1966; Ph.D., University of Southern California, 1971.
 Experience: Teaching assistant, University of California, Los Angeles.
- GLIDDEN, WALLACE F. (1961)**.....Head, Veterinary Science Department
 B.S., California State Polytechnic College, 1962; B.S., University of California, Davis, 1955; D.V.M., 1961.
 Experience: U.S. Army Veterinary Corps; poultry research, U.C.D.; large and small animal practice, southern California.
- GOEBEL, KAREN P. (1966)**.....Home Economics
 B.S., Purdue University, 1962; M.A., Ball State University, 1966.
 Experience: Advertising representative, American Zinc Institute; camp counselor and dining hall supervisor, Michigan; home demonstration agent-in-training, State of Indiana; foreign exchange, International Farm Youth Exchange; home economics teacher, Mishawaka, Indiana; graduate assistant, Ball State University.
- GOLD, MARCUS (1947) (1954)**.....Audio-Visual Service Coordinator
 B.A., University of California, 1942; B.L.S., 1947; additional graduate study, University of California.
 Experience: U.S. Army; library, University of California; audio-visual librarian, California State Polytechnic College; research assistant, University of California.

Faculty and Staff

GOLDBERG, SAUL (1970).....Electrical Engineering
B.S., Fairleigh Dickinson University, New Jersey, 1963; M.E., University of Florida, Gainesville, 1964; Ph.D., 1968.

Experience: Assistant professor, University of Miami, Coral Gables, Florida; research assistant, University of Florida, Gainesville; project engineer, Bendix Corporation, New Jersey; sales engineer, Krasner Associates, Great Neck, New York; assistant engineer, Kearfott Company, Clifton, New Jersey; laboratory technician, Blonder Tongue Laboratories, Newark, New Jersey.

GOLDEN, JAMES R. (1966).....Industrial Engineering
B.S., U.S. Military Academy, West Point, 1945; M.S., Ohio State University, 1961.

Experience: Pilot-Navigator, Wing Director of Safety, Strategic Air Command; Reliability engineer, Chief of Reliability Quality and Maintainability, Space Systems Division; Chief of Technical Integration, Aero Systems Division, U.S. Air Force. Registered professional engineer, California.

GOLDENBERG, STUART (1970).....Mathematics
B.S., University of California, Los Angeles, 1965; M.S., University of California, Riverside, 1969; Ph.D., 1970.

Experience: Teaching assistant and teaching fellow, University of California, Riverside; substitute teacher, Riverside Unified Schools.

GOMES, GEORGE J. (1967).....Agricultural Management
B.S., California State Polytechnic, 1966; M.A., 1968.

Experience: Farming; restaurant manager.

GOODEN, REGINALD H., JR. (1970).....Social Sciences
B.A., University of California, Los Angeles, 1962; M.A., University of California, Santa Barbara, 1969.

Experience: Teaching associate, University of California, Santa Barbara.

GORDON, RAYMOND G. (1967).....Mechanical Engineering
B.S., Western New England College, 1966; M.S., University of Michigan, 1967.

Experience: Design engineer, Universal Design, Inc.; draftsman, Duchess Design and Development, Oriole Engineering Company, Combustion Engineering; laboratory assistant, Western New England College.

GORDON, ROBERT L. (1967).....Ornamental Horticulture
Kent State University, Kent, Ohio; Graduate, American Floral Art School, Chicago, Illinois.

Experience: Science librarian, Kent State University; designer, Airport Florist, Akron, Ohio; owner, Gordon's Floral Art, Shop, Akron; designer-manager, Collin's West Towne Florist and Tauer's Flowers, Akron; assistant director, American Floral Art School, Chicago, Illinois.

GOWGANI, GEORGE G. (1970).....Crop Science
B.S., California State Polytechnic College, San Luis Obispo, 1964; M.A., 1968. Additional graduate study, Sacramento State College, Oregon State University, and University of Nevada.

Experience: Director, Agricultural Chemicals, Central Organization of Iranian Farmers Cooperative. Research technician, U.C. Davis; research fellow, University of Nevada.

GRAN, RUTH (1957).....Supervising Nurse
R.N., Mary's Help Hospital, San Francisco, 1936.

Experience: San Mateo Clinic; Army Nurse Corps; San Luis Obispo General Hospital.

GRANT, DAVID M. (1950).....English
B.A., Iowa State Teachers College, 1935; M.A., University of Iowa, 1940; Ph.D., Stanford University, 1953.

Experience: Instructor in public schools in Iowa; chairman, Department of Speech, Hastings College, Hastings, Nebraska; officer, U.S. Navy; instructor, Stanford University.

- GRANT, DONALD P. (1967)**.....Architecture
 B. Arch., University of Oklahoma, 1961; M. Arch., University of Utah, 1964; additional graduate study, University of California, Berkeley.
 Experience: Construction and architectural firms in Utah; Moore Simpson and Partners, London; Ulrich Franzen; Raymond and Rado; Victor Lundy. Registered architect, New York and California.
- GRAVES, R. L., JR. (1951) (1957)**.....Architecture
 B.S., Architecture, University of Kansas, 1948; M. Arch. and Urban Design, Cranbrook Academy of Art, 1950.
 Experience: Associate Professor, Auburn University; assistant professor, University of Florida; instructor, Washington State University; private practice, Kansas City; architectural designer-draftsman with architectural firms in North Carolina, Michigan, California; U.S. Naval Construction Battalion. Registered architect, Kansas.
- GRAVES, THEODORE G. (1947)**.....Engineering Technology
 B.A., Humboldt State College, 1940; M.S., Oregon State College, 1957.
 Experience: Instructor, Paia School, Paia, Maui, Hawaii; instructor, Maui High School, Maui, Hawaii; teacher, San Francisco, California; lecturer, University of California, Santa Barbara College.
- GREEN, WILFRED M. (1966)**.....English
 B.S., Drake University, 1951; M.A., California State Polytechnic College, 1965; additional graduate study, University of California and University of Illinois.
 Experience: Instructor, Bering Institute, Adak, Alaska, Fresno Adult School, Allan Hancock College, San Luis Obispo Adult School; teacher, Hartley High School, Stanwood Consolidated School, Iowa, Fresno High School, Orcutt School; contractor.
- GREENBERG, JOSEPH I. (1968)**.....Architecture
 B. Arch., Georgia Institute of Technology, 1967; M. Arch., University of Florida, 1968.
 Experience: Graduate teaching and research assistant, University of Florida; teaching assistant, Georgia Institute of Technology; draftsman, Alan Pokras; draftsman-delineator-designer, Toby Vece; designer, Jack H. Schecter, and Pierre Lutz, Westport, Connecticut.
- GREENE, RICHARD L. (1970)**.....Psychology
 B.A., California State College, Fullerton, 1967; M.A., University of Montana, 1968; Ph.D., 1970.
 Experience: Graduate student teaching assistant, University of Montana.
- GREFFENIUS, R. J. (1969)**.....Soil Science
 B.S., Colorado State University, 1932; M.F., University of Michigan, 1933; Ph.D., University of Michigan, 1968.
 Experience: District ranger, range analyst, staff officer, U.S. Forest Service, South Dakota, Colorado.
- GRINNELL, ROBIN R. (1967)**.....Agricultural Engineering
 B.S., Purdue University, 1955; M.S., University of Minnesota, 1961; additional graduate study, University of Illinois.
 Experience: Research assistant, Iowa State University, Purdue University, University of Illinois; research and teaching assistant, University of Minnesota; student engineer, John Deere Waterloo Tractor Works; assistant professor, University of Guelph, Ontario, Canada; U.S. Army QM and Signal Corps.
- GROSZ, DAVID W. (1967)**.....Men's Physical Education
 B.S., University of Oregon, 1960; M.S., 1965.
 Experience: Professional football player, Saskatchewan, Edmonton, Montreal, Oregon; high school biology instructor, Oregon; substitute teacher, Washington; high school physical education instructor and football coach, Hoquiam, Washington; director, summer program, Hoquiam Park Board.

Faculty and Staff

- GROVES, JOHN E. (1968).....Computer Science & Statistics
B.A., Pasadena College, 1963; M.A., University of California, Riverside, 1965; additional graduate study, University of Southern California.
Experience: Teaching assistant, University of California, Riverside; assistant professor, Pasadena College.
- GUSTAFSON, LESTER W. (1947).....Aeronautical Engineering
B.S., University of Minnesota, 1932; graduate study, University of Minnesota.
Experience: Assistant in experimental engineering, University of Minnesota; experimental engineer, Minneapolis Moline Power Implement Company, Minneapolis; Tropic Air Corporation, Chicago; aerodynamics engineer, Lockheed Aircraft Corporation; Hughes Aircraft Company.
- HADLEY, ROBERT E. (1967).....Animal Science
B.S., California State Polytechnic College, 1955.
Experience: U.S. Army; show horse trainer, Southern California; stallion manager, Shamel Ranch, Murrieta; large animal veterinary assistant, Murrieta; artificial insemination technician-distributor, dairy and beef cattle, Oakdale.
- HAFEMEISTER, DAVID W. (1969).....Physics
B.S., Northwestern University, 1957; M.S., University of Illinois, 1960; Ph.D., 1964.
Experience: Mechanical engineer, Argonne National Laboratory; teaching and research assistant, University of Illinois; post doctoral fellow, Los Alamos Scientific Laboratory; assistant professor, Carnegie-Mellon University.
- HAGGARD, KENNETH L. (1967).....Architecture
B.S., Texas A & M, 1958; B. Arch., North Carolina State University, 1963; M. Arch., University of Pennsylvania, 1967.
Experience: Principal planner, Department of Planning and Renewal, Camden, New Jersey; instructor, University of Miami; designer, City Planning & Architectural Associates, North Carolina; research scientist, Radio Biological Laboratory, Balcones Research Center; U. S. Army; tool engineer, Boeing Aircraft.
- HALE, THOMAS E. (1966).....Mathematics
B.S., Indiana State University, 1960; M.S., 1963; additional graduate study, St. Louis University.
Experience: Teacher, Vigo County School Corporation, Terre Haute, Indiana.
- HALES, G. LYNN (1970).....History
B.A., Willamette University, 1962; M.A., Stanford University, 1964; additional graduate study, Stanford University.
Experience: Teaching assistant, graduate assistant, Stanford University.
- HALL, LLOYD A. (1966).....Medical Officer
B.A., Stanford University, 1947; M.D., 1952.
Experience: Internship, San Francisco City and County Hospital; residency, Monterey County Hospital; postgraduate training, anesthesia, Cook County Hospital, Chicago; private practice, Fort Bragg, California; college physician, Fresno State College.
- HALL, MICHAEL C. (1967).....Animal Science
B.S., California State Polytechnic College—Kellogg, 1965; M.S., Kansas State University, 1967.
Experience: Graduate research assistant; general farming.
- HALL, RICHARD E. (1947).....Engineering Technology
B.S., California State Polytechnic College, 1952.
Experience: Aircraft mechanic, Lockheed Aircraft, and Hancock Field, Santa Maria; engine mechanic and supervisor, McClellan Air Field.
- HALLETT, JAMES T. (1967).....Crops Science
B.A., San Francisco State College, 1959; additional study, California State Polytechnic College.
Experience: Research biologist, Stauffer Chemical Company; field research agronomist, U.S. Borax Research Corporation and Germain's Inc.

- HANKS, CHARLES J. (1954)**.....Mathematics
B.S., Pennsylvania State Teachers College at Shippensburg, 1942; M.A., University of Pennsylvania, 1949; Ed.D., University of Arkansas, 1954.
Experience: Assistant professor, Drexel Institute of Technology; assistant football coach, University of Arkansas; officer, U.S. Coast Guard.
- HANNA, MAURICE (1970)**.....Philosophy
B.A., American University of Beirut, 1957; M.A., University of Southern California, 1967; Ph.D., 1969.
Experience: Lecturer, University of Southern California.
- HANNULA, REINO (1962)**.....Computer Science & Statistics
B.A., University of California, Los Angeles, 1960; M.A., 1965; additional graduate study, Institute of Computer Science, University of London, Tulane University, University of Massachusetts.
Experience: Manager, grocery, Santa Monica; self-employed, Los Angeles; teacher, Redondo Beach High School.
- HANSEN, PHYLLIS JEAN (1963)**.....Library
A.B., University of Illinois, 1960; M.S.L.S., 1961.
Experience: Student assistant, University of Illinois Library; librarian, Queens Borough Public Library; reference librarian, Community Library, San Leandro, California.
- HARDEMAN, SARAH A. (1960)**.....Home Economics
B.S., Tennessee College, 1930; M.S., Iowa State University, 1946; additional graduate study at University of Tennessee (Martin Branch), Iowa State University.
Experience: Vocational Home Economics teacher, high schools in Tennessee.
- HARDEN F. SHELDON (1948)**.....Men's Physical Education
B.A., Santa Clara, 1943; M.A., College of the Pacific, 1950.
Experience: Player-coach, Sacramento Nuggets professional football team; playground supervisor, City of Sacramento; Red Cross swimming instructor, San Luis Obispo High School; officer, U.S. Army.
- HARPER, RICHARD R. (1968)**.....Director of Athletics
B.S., University of California, Los Angeles, 1959; M.S., 1960.
Experience: Assistant freshman coach, UCLA; head football coach, Riverside City College; line coach, Colorado State University, University of California at Santa Barbara, University of Colorado.
- HARRIGAN, JOHN E., JR. (1969)**.....Psychology
B.A., University of California, Berkeley, 1959; M.A., San Jose State College, 1962; Ph.D., Colorado State University, 1966.
Experience: Engineering psychologist, Naval Electronics Lab, San Diego; assistant professor, Washington State University; teaching assistant, Colorado State University; supervisor and human factors engineer, Chrysler Corporation; supervisor, human factors research, Martin Company; instructor, Loyola University; engineer, Lockheed Space and Missile Corporation.
- HARRIS, MARY ELIZABETH (1969)**.....Library
B.S., San Diego State College, 1950; B.A., University of Oklahoma, 1952; M.S. in Library Science, University of Southern California, 1957.
Experience: Assistant librarian, Southwestern Medical School, University of Southern California; cataloger, U.S. Army Dependents' Education Group, Germany and California Western University; serials librarian, Lafayette College, Wisconsin State University.
- HARRIS, ROY M. (1954)**.....Animal Science
B.S., Utah State Agricultural College, 1952; M.S., 1954; Ph.D., 1970.
Experience: Butcher, Swift and Co., Ogden, Utah; breeding herdsman, Suncrest Hereford Ranch, Springerville, Arizona; Gibbs Quarter Horse and Hereford Ranch, Mackay, Idaho; livestock husbandman, Utah State University farm, Logan, Utah; U.S. Army.

Faculty and Staff

- HARROW, DAVID R. (1970)**.....Social Sciences
A.B., Chico State College, 1960; M.A., 1968; additional graduate study, University of Oklahoma.
Experience: Instructor and department chairman, Chico Junior High School; instructor, Chico State College and Oklahoma Christian College, Oklahoma City; assistant professor, Appalachian State University, Boone, North Carolina.
- HASKELL, CHARLES THOMSON (1963)**.....Mathematics
B.A., University of Washington, 1946; M.S., University of Arizona, 1961; Ph.D., 1965.
Experience: Teacher, Fallon, Nevada, High School; trust clerk, Peoples National Bank of Washington; trust clerk, assistant trust officer, First National Bank of Nevada; graduate assistant, University of Arizona.
- HASSLEIN, GEORGE J. (1949)**.....Dean, School of Architecture and Environmental Design
B. of Arch., University of Southern California, 1945, F.A.I.A.
Experience: Road and bridge design in Mexico and Central America for Pan-American Highway; airport design for Army Engineers; development work at M.I.T. for Gilfillan Bros.; with architects and practice in Los Angeles area; designer for Summer Spaulding and Wurdeman and Becker; chief designer, Kistner, Curtis and Wright. Registered architect, California. NCARB Certificate.
- HASTIE, WILLIAM L., COL. (1969)**.....Head, Military Science Department
B.A., Stanford University, 1947; U.S. Army Command and General Staff College, 1957; M.A., John Hopkins University, 1967.
Experience: Command and staff assignments in the Mediterranean and Pacific Theaters; commander, engineering and supply director, Sandia Base, New Mexico; assistant professor of military science, Kingston, Rhode Island; director, Department of Non Residential Instr., director A.C.D., U.S., Army Intelligence School, Fort Holabird, Maryland.
- HATFIELD, R. C. (1949)**.....Biological Sciences
B.Sc., University of Dayton, 1941; M.A., University of California at Los Angeles, 1947; Ph.D., 1950.
Experience: Chemist, Research Division, National Cash Register Co.; U.S. Navy; assistant in bacteriology, University of California at Los Angeles; chief of laboratories, F.O.D. Assessment Branch, U.S. Army Biological Warfare Laboratories, Fort Detrick, Maryland; U.S. Public Health Service, World Health Organization, Panamericano de Zoonosis in Argentina.
- HAWES, MICHAEL (1968)**.....Electronic Engineering
B.Engr., University College, Dublin, Ireland, 1958; M.S., Ohio State University, Dayton, Ohio, 1967.
Experience: Demonstrator, University College, Dublin, Ireland; Electricity Supply Board, Ireland; instructor, Villanova University, Pennsylvania; research engineer, Wright-Patterson Air Force Base, Dayton, Ohio.
- HAWLEY, LEWIS B. (1969)**.....Chemistry
B.S., University of North Carolina, 1962; Ph.D., University of Georgia, 1966.
Experience: Teaching and research assistant, University of North Carolina; N.A.S.A. fellow, University of Georgia; research associate, Indiana University, University of California at Berkeley; instructor, University of California.
- HAYES, JAMES H. (1969)**.....Journalism
B.A., San Jose State College, 1950; M.A., University of Florida, 1966; additional graduate study, University of Minnesota.
Experience: Reporter, copy editor, telegraph editor, and city editor, daily newspapers in California, Arizona, Oklahoma, and Washington, D.C.; graduate assistant, University of Florida; lecturer, American University, Cairo, U.A.R.; assistant professor, University of Arizona; instructor and assistant to Dean of Liberal Arts, University of Minnesota.

Faculty and Staff

- HAYS, LLOYD D. (1969)**.....Philosophy
B.A., Michigan State University, 1955; M.A., 1958; Ph.D., 1966.
Experience: Assistant professor, Westmont College, University of South Dakota; associate professor, Southern Oregon College.
- HAZEBROOK, HARRY (1968)**.....Electronic Engineering
B.S., Michigan College of Mining and Technology, 1949; M.S., University of Wisconsin, 1951.
Experience: Chief systems engineer, Navigation Computer Corporation; engineering manager, Electro-Mechanical Research, Inc.; engineer, General Electric Company, Convair, Jansky and Bailey; instructor, University of Wisconsin.
- HEAD, DWAYNE G. (1966)**.....Men's Physical Education
B.S., Jamestown College, 1958; M.S., South Dakota State University, 1963; Ed.D., University of Oregon, 1967.
Experience: Instructor, West Fargo High School, South Dakota State University, University of North Dakota; teaching assistant, University of Oregon.
- HEALEY, JOHN R. (1947)**.....Head, Journalism Department
B.A., San Jose State College, 1941; M.S., University of California at Los Angeles, 1964.
Experience: Reporter, San Jose News; public relations, McClellan Field, Sacramento; reporter, Sacramento Union; Valley editor, Modesto Bee.
- HEATON, RICHARD (1970)**.....Men's Physical Education
B.A., Iowa State Teachers College, 1960; M.A., California State Polytechnic College, San Luis Obispo, 1969.
Experience: Manager, Peterson Sales & Service, Waterloo, Iowa; part-owner, Heaton Sage Rambler, Waterloo; owner-manager, Heaton Enterprises, Cedar Falls, Iowa; supervisor of recreation, California Men's Colony.
- HEIFETZ, EMANUEL R. (1962)**.....Music
B.A., University of Redlands, 1950; M.M., 1958; additional graduate study, Claremont Graduate School. Extensive private music study with Luboviski, Pollak, Zaslowsky, and Meremblum.
Experience: Instrumental music instructor, San Bernardino Valley College; string and orchestra director, Summer Music Workshops; instructor-director, Community Orchestra, San Bernardino Adult Education; master teacher, University of Redlands; instrumental music teacher, Redlands City Schools and Inglewood Unified School District; composer of published violin method and other works.
- HEINZ, JOHN A. (1953)**.....Director, Audio-Visual Services and Production
B.A., University of Washington, 1950; M.A., Ohio State University, 1964.
Experience: Technical and research assistant, University of Washington; production assistant, Korry Film Productions; free lance photographer, Seattle; production co-ordinator, Criterion Films, Inc., Seattle; film editor, KRON-TV, San Francisco.
- HELMAN, ANATOL (1957)**.....Architecture
B.S., Warsaw Polytechnic Institute, 1934.
Experience: Designer, Associated Architects and Planners, Dallas, Tex.; The Anglo-Iranian Oil Co., Abadan, Iran; master-planner, International Technical Associates (ITA); Architects-Planners, Milan, Italy; architect, T. B. Bourne Associates, Washington, D.C. and Tokyo, Japan; Tecnicos Expanoles Asociados, Madrid, Spain; Warsaw Municipality; instructor, University of Nebraska; University of Oklahoma; Navy Orientation School. Visiting Fulbright professor in Architecture, University of Guayaquil and Central University, Ecuador.
- HENDEL, FRANK J. (1967)**.....Aeronautical Engineering
B.S., Polytechnika Lwowska, Poland, 1935; M.S., 1937; Ph.D., 1941.
Experience: Consultant and technical specialist, North American Aviation; technical staff, Jet Propulsion Laboratory; engineer, Aerojet General Corp., Wigton-Abbott Corp., Anglo-American Oil Co., Foster-Wheeler, Ltd., Iraq Petroleum Co.; instructor, Polytechnika Lwowska.

Faculty and Staff

HENDRICKS, FRANCIS (1969).....Architecture

A.B., University of California, Berkeley, 1950; M.City & Regional Planning, 1953.
Experience: Associate research professor, University of Pittsburg; lecturer, Stanford University; partner, Planning Research Associates, San Francisco; senior consultant, Arthur D. Little, Inc., Cambridge, Massachusetts; principal, Francis Hendricks & Assoc.; principal planner, 12th Naval District, U.S. Navy; private planning consultant, California; planner, City of Sausalito.

HENDRIKS, HAROLD J. (1952).....Electronic Engineering

B.S., Iowa State University, 1940; M.S., 1941; additional graduate study, University of Colorado, 1949.

Experience: Engineer, Collins Radio Co., Cedar Rapids, Iowa; engineer, U.S. Naval Ordnance Test Station, China Lake; industrial experience program, Westinghouse Electric Corp., East Pittsburgh, Pennsylvania; engineer, Radio Corporation of America, Camden, New Jersey; engineer, Burroughs Corp., ElectroData Division, Pasadena; faculty associate, The Boeing Company, Seattle, Washington; associate professor, electrical engineering, University of Nevada, Reno, Nevada.

HENNIG, LLOYD R. (1963).....Medical Officer

B.S., University of California, 1927; M.D., 1932.
Experience: Internship, San Francisco General Hospital; residency, Franklin Hospital, San Francisco; U.S. Army; private practice, Willows.

HENSEL, DONALD W. (1960).....History

B.S., University of North Dakota, 1949; M.A., University of Colorado, 1953; Ph.D., 1957.

Experience: Instructor, public schools in Colorado, New Mexico, Arizona; graduate assistant, University of Colorado, Boulder; instructor in history and coordinator of Arts and Sciences instruction, University of Colorado, Denver; head, Social Sciences Department, Associate Dean, Academic Planning, California State Polytechnic College.

HERALD, CHARLES A. (1958).....Electronic Engineering

B.Sc., M.Sc., Dalhousie University, Halifax, Nova Scotia, 1935.
Experience: Assistant professor, University of Massachusetts; instructor, Pennsylvania State University; instructor, Communication School, Canadian Department of National Defense; lecturer, McGill University; lecturer, University of British Columbia; special gauge examiner, assistant and junior physicist, National Research Council, Ottawa.

HESCH, EARL R. (1956).....Engineering Technology

B.S., University of New Mexico, 1955; M.S., Oklahoma A. & M. College, 1956.
Experience: U.S. Army; draftsman, Los Alamos Scientific Laboratory; survey party chief, C. H. Cole; surveyor-draftsman, City of Albuquerque.

HICKS, WILLIAM R. (1957).....Men's Physical Education

B.S., University of California, Los Angeles, 1950; M.A., Long Beach State College, 1959.
Experience: United States Army; teacher, Long Beach City Schools.

HIGDON, ARCHIE (1967).....Dean, School of Engineering and Technology

B.S., South Dakota State University, 1928; M.S., Iowa State University, 1930; Ph.D., 1936.

Experience: Chairman, Engineering Science Division; professor and head, Mechanics; Associate Dean, U.S. Air Force Academy; professor, U.S. Military Academy, Iowa State University; instructor, North Dakota State University; management analyst, Headquarters 15th Air Force (SAC); officer, U.S. Army Air Force. Registered professional engineer, Colorado.

HITCHCOCK, VAUGHAN D. (1962).....Men's Physical Education

B.S., Washington State University, 1956; M.A., San Francisco State, 1965.
Experience: Physical education instructor, football and wrestling coach, Castro Valley High School; physical education instructor, football and wrestling coach, Hayward High School; teacher, Juvenile Hall, Alameda County Special Schools; playground, swimming and recreation director, Hayward Area Recreation Department, Hayward.

Faculty and Staff

- HOFFMAN, GEORGE E. (1956)**.....Industrial Engineering
 B.S., Carnegie Institute of Technology, 1951; B.S., California State Polytechnic College, 1962; M.B.A., University of Southern California, 1959; M.S., Stanford University, 1960; additional graduate study, Oregon State University.
 Experience: Time and methods engineer, Robertshaw Fulton Controls; Kennecott Copper Corporation, Ray, Arizona. Registered professional engineer, California.
- HOFFMANN, JON A. (1968)**.....Aeronautical Engineering
 B.S., University of Wisconsin, 1964; M.S., 1966; additional graduate study, Wisconsin State University.
 Experience: Draftsman, Marathon Electric, Wausau, Wisconsin; engineer, Chemstrand Corporation, Pensacola, Florida; research engineer, Caterpillar Tractor, Peoria, Illinois; instructor, University of Wisconsin; research engineer, Trane Company, LaCrosse, Wisconsin.
- HOGAN, WILBUR C. (1959)**.....Philosophy
 B.S., United States Coast Guard Academy, 1928; M.S., Purdue University, 1959.
 Experience: Officer, U.S. Coast Guard; commanding officer, Port Townsend Training Station; director, U.S. Coast Guard Institute.
- HOLLEY, F. JERALD (1961)**.....Director, Admissions, Records and Evaluations
 B.S., Utah State University, 1961; M.A., California State Polytechnic College, 1968.
 Experience: U.S. Air Force; private business, Rexburg, Idaho.
- HOLMQUIST, ROBERT E. (1946)**.....Physics
 B.A., University of Oregon, 1932; M.A., Oregon State College, 1936; additional graduate study, Purdue University and University of Washington.
 Experience: Teaching assistant, University of Oregon and Oregon State College; instructor, University of Oregon; teaching fellow, Purdue University and University of Washington; inspection supervisor, Boeing Aircraft Company.
- HOLT, DONALD N. (1970)**.....Journalism
 B.A., University of Colorado, 1950; M.S., University of Wisconsin, 1970.
 Experience: Advertising staff, Greeley, Colorado Tribune; Visalia, California Times-Delta; public information, head, agricultural information, director, photographic services, University of California, Davis; agricultural editor, Colorado State University; instructor, Wisconsin State University.
- HOLT, RAY J. (1955)**.....Physics
 A.B., University of California, 1939; M.A., 1949.
 Experience: Physicist, University of California Radiation Laboratory; aircraft inspector, Consolidated Vultee Aircraft Corporation; high school and junior college teacher.
- HOLTZ, WALTER E. (1954) (1968)**.....Head,
 Environmental Engineering Department
 B.S., Illinois Institute of Technology, 1949; M.S., California Institute of Technology, 1953; M.S., University of Washington, 1964.
 Experience: Professor, California State Polytechnic College, Pomona; project engineer, engineer, U.S. Naval Air Missile Test Center; U.S. Air Force; consultant, USAID. Registered professional engineer, California.
- HOMAN, DENNIS N. (1966)**.....Biological Sciences
 B.A., University of Iowa, 1955; M.S., 1958; Ph.D., 1960.
 Experience: Instructor, University of Iowa; assistant professor, Illinois State University; associate professor, Wisconsin State University.
- HOMFELD, GILBERT L. (1960)**.....Mathematics
 A.B., Santa Barbara State College, 1936; M.A., California State Polytechnic College, 1960.
 Experience: Tulare County Schools Office, teaching; school building draftsman and inspector; engineering draftsman, Southern California Gas Company, Visalia; ranching in Visalia; teaching, Selma Junior High School, Fresno County.

Faculty and Staff

HONEGGER, HARRY H. (1961).....Welding and Metallurgical Engineering
B.S.M.E., Oregon State College, 1950; M.S.M.E., 1952.

Experience: Welder, Oregon Shipyards; U.S. Army; laboratory supervisor, Metallurgical Engineers, Inc.; registered professional engineer, Oregon. Registered professional engineer, California.

HOOKS, ROBERT D. (1966).....Animal Science
B.S., California State Polytechnic College, 1961; M.S., Iowa State University, 1964; Ph.D., 1966.

Experience: Swine herdsman, State College of Washington, Pullman, Washington; manager and part-owner, orchard and swine farming enterprise, Orland, California; U.S. Marine Corps.

HOOVER, ROBERT L. (1970).....Social Sciences
A.B., University of California, Berkeley, 1965; M.A., 1969.

Experience: University of California Archaeological Survey, Berkeley; graduate assistant, University of California, Berkeley; instructor, Merritt College, Oakland; midshipman, U.S. Navy.

HORTON, WILLIAM F. (1968).....Electrical Engineering
B.S., California Institute of Technology, 1946; M.S., 1948; Ph.D., UCLA, 1966.

Experience: Department head, senior staff engineer, Hughes Aircraft Company; design specialist, section head, Lear Siegler, Inc.; engineer, Westinghouse Electric; research engineer, associate in engineering, UCLA.

HOSTETTER, H. CLYDE (1958).....Audio-Visual
B.J., University of Missouri, 1949; graduate study, University of Kansas, University of Southern California, American University.

Experience: Officer, U.S. Navy; feature writer and chief photographer, Topeka (Kansas) Daily Capital; public relations director, United States Junior Chamber of Commerce; public relations consultant, Hughes Aircraft Company; editor official Kansas magazine, To the Stars; editor official Junior Chamber magazine, Future; associate editor, Pathfinder and Town Journal; free-lance writer and photographer.

HOUK, A. L. (1946).....Chemistry
B.S., Michigan State College, 1926; M.S., 1928; Ph.D., Pennsylvania State College, 1933.

Experience: Graduate assistant in chemistry, Michigan State College and Pennsylvania State College; instructor in chemistry, Michigan State College; research chemist and group leader, Rohm and Haas Company, Philadelphia, Pennsylvania.

HOULIS, JEROME F. (1959).....Chemistry
B.S., California State Polytechnic College, 1958; graduate study, California State Polytechnic College.

Experience: Electronics maintenance, U.S. Air Force.

HOUSTON, ERNEST R. (1957).....Ornamental Horticulture
B.S., Oklahoma State University, 1943; M.S., Ohio State University, 1947; additional graduate study, Oklahoma State University.

Experience: Assistant professor, Oklahoma State University; manager of plant shipments, Furrow and Co., Guthrie, Oklahoma; grower and consultant, Higdon Flower Shop and Nursery, Oklahoma City, Oklahoma; U.S. Army.

HOWARD, LORRAINE H. (1964).....Associate Dean, Women
B.S., Oregon State College, 1945; Ed.M., Oregon State University, 1961; Ph.D., 1964.

Experience: Assistant buyer, Meier & Frank Co., Portland; assistant chemist, Hawley Pulp and Paper, Oregon City; assistant to director, Fruit & Flower Day Nursery, Portland; teacher, Oregon State University.

- HOYT, HOMER E. (1969).....Education
Ed.B., Rhode Island College of Education, 1940; M.A., University of California, Berkeley, 1956.
Experience: Executive director, Northern San Joaquin Valley Counties Supplementary Education Center; district superintendent, Healdsburg High School and Elementary School Districts; assistant superintendent, instructional services, San Luis Obispo County Schools; elementary and junior high school principal, San Rafael City Schools.
- HSIEH, CARL C. F. (1970).....Architecture
B.S., National Taiwan University, 1961; M.S., So. Dakota School of Mines and Technology, 1965; Ph.D., Northwestern University, 1968.
Experience: Engineering officer, ROTC Nationalist Chinese Airforce, Taiwan; structural engineer, Taiwan Public Works; research fellow, South Dakota School of Mines and Technology; research assistant, Northwestern University; body engineer in advance development group, Chrysler Corporation, Detroit, Michigan.
- HSU, JOHN Y. S. (1970).....Computer Science and Statistics
B.S., National Taiwan University, 1959; M.S., University of California, Berkeley, 1964; Ph.D., 1969.
Experience: Research engineer, Broadcasting Corporation of China; teaching fellow, research assistant and reader, University of California, Berkeley; research engineer, Gertea Product; project engineer, Librascope, Fairchild Core Memory; computer architect, Varian Data Machines.
- HUEHN, KEMPTON L. (1968).....Mathematics
B.S., Iowa State University, 1957; M.S., 1962; additional study, Iowa State University.
Experience: Member technical staff, T.R.W. Systems Group; instructor, Iowa State University.
- HUFF, EARL D. (1970).....Social Sciences
B.A., San Francisco State College, 1959; M.A., University of Idaho, 1969; additional graduate study, University of Idaho, American University of Beirut.
Experience: Instructor, Solano College, Vallejo, California; chairman, Social Studies Department, Solano Junior High School, Vallejo; Fulbright exchange teacher, England; NSF fellow, University of Idaho; Fulbright fellow, American University of Beirut, Lebanon.
- HUOT, ROBERT J. (1963).....English
B.A., University of Washington, 1946; M.A., 1951; additional graduate study, University of Utah.
Experience: Teaching fellow, University of Washington; instructor, Tulane University; associate, University of Washington; instructor, Montana State College; graduate assistant, University of Utah.
- HUTTON, REX L. (1966).....Mathematics
B.S., Baldwin Wallace College, 1959; M.S.T., Illinois Institute of Technology, 1964.
Experience: Teacher, Brooklyn Junior High School; research assistant, Education Research Council of Greater Cleveland; instructor, Cuyahoga Community College.
- HYER, EDGAR A. (1951).....Agricultural Management
B.S., Utah State College, 1939; M.S., 1942; Ph.D., Cornell University, 1948.
Experience: Land use economist, Utah; field supervisor of A.A.A., Utah; U.S. Army; graduate assistant, Cornell University; assistant professor of agricultural economics, Oregon State College.

Faculty and Staff

- HYNES, C. DENNIS (1957)**.....Biological Sciences
B.A., Macalester College, 1951; M.S., University of Michigan, 1953; Ph.D., University of Florida, 1957.
Experience: Museum assistant, University of Michigan; teaching assistant and research assistant, University of Florida.
- IKENOYAMA, GEORGE K. (1964)**.....Architecture
B.S., California State Polytechnic College, 1955; additional graduate study, Pennsylvania State University, Montana State University, California State Polytechnic College.
Experience: Draftsman and associate, John Badgley; lecturer, California State Polytechnic College. Registered architect, California.
- IRVIN, MELVA (1968)**.....Women's Physical Education
A.B., Colorado State College, 1963; M.S., Pennsylvania State University, 1968.
Experience: Teacher, Righetti High School, Santa Maria; graduate assistant, instructor, Pennsylvania State University.
- ISACHSEN, OLAF F. (1971)**.....Business Administration
Commercial Letter, Treider's Commercial School, Oslo, Norway, 1955; B.Engr., Institute of Textiles, Boras, Sweden, 1956; M.B.A., Harvard School of Business, 1961; Ph.D., Michigan State University, 1970.
Experience: Assistant professor, Arcadia University, Nova Scotia; manager, Isco A.G., Zurich, Switzerland; export consultant, Isco A/S, Oslo, Norway; production manager, Udis A/S, Oslo, Norway.
- ISHERMANN, ELEANOR (1970)**.....Library
B.A.E., University of New Mexico, 1956; M.A. in Librarianship, San Jose State College, 1970.
Experience: Teacher of primary grades and Art in California Elementary Schools.
- JACKS, MADGE A. (1964)**.....Medical Officer
M.D., Loyola University Medical School, Chicago.
Experience: Internship, Cook County Hospital, Chicago; residency, Municipal Contagious Disease Hospital, Chicago; residency, Illinois Research & Educational Hospital, Chicago; private practice, Chicago; St. Joseph's Hospital Laboratory, San Francisco; residency, San Luis Obispo General Hospital.
- JACOBS, JAMES W. (1967)**.....Animal Science
B.S., Oklahoma State University, 1967.
Experience: Livestock showing, judging, and ranching operations.
- JAMES, AERNAT S. (1965)**.....Physics
B.S., University of Madras, 1956; M.A., Southern Illinois University, 1963.
Experience: Instructor, Orient Technical College, Frostburg State College; research assistant, Southern Illinois University; assistant, U.S. Embassy, Kabul, Afghanistan.
- JAMES, ARTHUR F. (1956)**.....Medical Officer
M.D., University of Chicago, 1953; B.A., University of California at Los Angeles.
Experience: Internship, U.S.P.H.S. Hospital, Staten Island, New York; U.S. Public Health Service, San Pedro; private practice, Wilmington.
- JAMESON, GLORIA (1967)**.....Foreign Language and Linguistics
B.A., Texas Woman's University, 1941; M.A., Teacher's College, Columbia University, 1944; Ph.D., University of Texas, 1966.
Experience: Librarian, Galveston Public Schools; elementary teacher in Houston, San Antonio, Texas; Muskogee, Oklahoma; and Montgomery County, Maryland; consultant in education, Montana, and Christ Church, Alexandria, Virginia; professor of English, Ewha Woman's University, Seoul, Korea; research associate, linguistics, University of Texas; director, intensive English program, Vietnamese Leadership/Scholarship Program, California State Polytechnic College.

Faculty and Staff

- JENKINS, STARR (1961)**.....English
 B.A., University of New Mexico, 1948; M.A., Stanford University, 1959.
 Experience: Navy and Army; instructor, Albuquerque Public High Schools; laborer, firefighter, smokejumper and aerial observer with U. S. Forest Service, California, Oregon, Montana, and Idaho; national park ranger, Yosemite; information specialist (writer-photographer), U. S. Forest Service, Southwestern Regional Office, Albuquerque, New Mexico; free-lance writer-photographer.
- JENNINGS, CHARLES W. (1968)**.....Art
 B.A., Wheaton College, 1966; M.A., M.F.A., Northern Illinois University, 1968.
 Experience: Factory worker, IBM; graduate assistant, Northern Illinois University.
- JENSEN, JAMES J. (1948)**.....Men's Physical Education
 A.B., Washington State College, 1935; M.S., Stanford University, 1940.
 Experience: Football and track coach, Shelton High School, Washington; history teacher and football and track coach, Santa Rosa High School, Santa Rosa; track coach and guidance assistant, Menlo Junior College, Menlo Park; U. S. Navy; track coach and instructor in health and physical education, San Francisco Junior College.
- JOHNSON, BOYD WALKER (1969)**.....Mathematics
 B.S., United States Naval Academy, 1951; M.S., North Carolina State College, 1956; Ph.D., North Carolina State University, 1963.
 Experience: Assistant professor, U.S. Air Force Academy and Florida Presbyterian College; Dean of Men, Florida Presbyterian College.
- JOHNSON, CORWIN M. (1961)**.....Head, Crops Science Department
 B.S., State College of Washington, 1950; M.S., 1951; Ph.D., Cornell University, 1953.
 Experience: Field and laboratory technician, research assistant, Department of Agronomy, State College of Washington; research assistant, Department of Agronomy, Cornell University; research agronomist, Northwestern Washington Experiment Station; assistant professor and agronomist, Mississippi State University.
- JOHNSON, ERIC V. (1969)**.....Biological Sciences
 B.A., Brown University, 1964; Ph.D., Cornell University, 1969.
 Experience: Teaching and research assistant, assistant curator of birds, Cornell University.
- JOHNSON, MEAD R. (1956)**.....English
 B.A., University of Denver, 1939; M.A., 1949; additional graduate study, University of Denver.
 Experience: Advertising manager, Sterling (Colorado) Farm Journal; U. S. Army; instructor in Colorado and California public schools; instructor, Colorado School of Mines; associate professor, Central Missouri State College.
- JOHNSON, MILES B. (1957)**.....English
 B.A., Gustavus Adolphus College, 1947; M.A., University of Minnesota, 1951; M.A., University of Denver, 1953; M.A., University of Iowa, 1966; additional graduate study, University of Washington, University of Southern California, University of Iowa.
 Experience: Instructor and publications adviser, Florence State College; instructor and publications chairman, Memphis State University; instructor, University of Tennessee, Memphis; assistant professor, Luther College; instructor, University of Puget Sound; presidential assistant, Johnson Wholesale and Manufacturing Company; author.
- JOHNSON, RICHARD F. (1950)**.....Head, Animal Science Department
 B.S., Iowa State College, 1942; M.S., State College of Washington, 1947.
 Experience: U.S. Army; instructor, College of Agriculture and assistant animal husbandman, Experiment Station, State College of Washington, Pullman, Washington.

Faculty and Staff

- JOHNSON, WILLIAM V. (1966)** Music
 B.M.E., Indiana University, 1962; M.M., University of Michigan, 1966.
 Experience: Instrumental music instructor, Seeger Memorial High School, Indiana; musical director, Light Opera Company, Illinois; assistant to conductor and member of band staff, University of Michigan.
- JOHNSTON, ROBERT M. (1946-54) (1956)** Engineering Technology
 B.A., Santa Barbara State College, 1937; graduate study, Boeing School of Aeronautics.
 Experience: Meteorologist, Pan American Airways and Pennsylvania Central Airlines; meteorology instructor, Randolph Field and Pan American Airways; junior civil engineer, Division of Highways, California.
- JOHNSTON, THOMAS V. (1967)** Architecture
 Diploma of Teaching, Victoria University, New Zealand, 1948; Visual Arts Certificate, London University, 1950; D.A., 1952.
 Experience: Newspaper Art critic, guest artist, head, Art Department, Palmerston North Teachers College and Waihi College, New Zealand; lecturer, Glasgow School of Art, Glasgow. Member "Queen Elizabeth II Arts Council," New Zealand.
- JONES, JACK B. (1969)** Education
 B.A., University of California, Santa Barbara, 1957; M.A., 1965; Ed.D., University of Arizona, 1970.
 Experience: Administrative officer, U.S. Army; sergeant, Santa Barbara Police Department; elementary teacher, Santa Barbara, Goleta; graduate assistant, University of Arizona; instructor, Ventura College.
- JONES, JOHN R. (1961)** Business Administration
 B.S., University of Minnesota, 1931; LL.B., George Washington University, 1938.
 Experience: Head, Social Science Department, Sedro Woolley, Washington Union High School; Identification Division, FBI; special agent, Public Works Administration; special agent, FBI.
- JONES, RICHARD V. (1969)** Education
 A.B., Fresno State College, 1949; M.A., 1952; Ed.D., University of California, Berkeley, 1958.
 Experience: Teacher, Fresno City Schools; consultant in Field Service, research assistant, staff associate and Director of Research, extension teacher, University of California; principal, Petaluma Senior High School; superintendent, Oroville Union High School District; Director of Continuing Education and Placement Services, Chico State College.
- JORGENSEN, EDWARD J. (1947)** Men's Physical Education
 B.A., Chico State College, 1936; M.S., University of Southern California, 1950.
 Experience: Instructor, physical education and industrial arts, South Fork, Fern- dale, and Watsonville high schools; athletic director, Marin Junior College; officer, U.S. Navy.
- JORGENSEN, NANCY ANN (1968)** Counselor
 B.A., University of Hawaii, 1957; graduate study, Institute of Psychology, University of Paris, University of Hawaii, University of California, Santa Barbara.
 Experience: Graduate assistant, University of Hawaii; psychometrist, California State Polytechnic College; senior psychometrist, University of California, Berkeley; junior assistant-research, U.C.L.A.; psychometrist and associate psychologist, San Luis Obispo County Community Mental Health Services.
- JUDD, W. BOYD (1956)** Mathematics
 B.S., St. Mary's College, 1939; M.A., University of California, 1951; D.Ed., the Pennsylvania State University, 1969.
 Experience: High school teacher, California; instructor, Army specialized training program, University of Santa Clara; research mathematician, University of California; computer laboratory, in charge of statistical operations, Bureau of Research and Guidance, Office of Los Angeles County Superintendent of Schools; tabulator machine supervisor, State of California, Department of Public Health; participant in National Science Foundation Institute, New Mexico State University.

Faculty and Staff

- KABAT, HERBERT R. (1952)** Physics
 B.S., United States Naval Academy, 1938; M.A., Stanford University, 1951; additional graduate study, University of Southern California, Stanford University, University of Colorado.
 Experience: Officer, U. S. Navy; research analyst, Rheem Mfg. Co.; instructor, Pasadena City College, College of the Sequoias.
- KANE, JOHN J. (1969)** Head, Mechanical Engineering Department
 B.S., U.S. Naval Academy, 1951; M.S., University of Pittsburgh, 1959, Ph.D., 1961.
 Experience: Adjunct Professor, University of Pittsburgh; engineer, Westinghouse Electric Corporation, Pittsburgh; lecturer, University of Southern California; member technical staff, Aerospace Corporation; self-employed, Sales Management; officer, U.S. Marine Corps.
- KANN, DAVID J. (1969)** English
 B.A., Brandeis University, 1964; M.A., New York University, 1966.
 Experience: Teaching associate, Occidental College; instructor, Polytechnic School, Pasadena.
- KASTNER, GEORGE W. (1970)** English
 B.A., Fresno State College, 1965.
 Experience: Teaching assistant, instructor, University of Washington.
- KATEKARU, JAMES (1969)** Chemistry
 B.S., University of Oregon, 1956; M.S., University of Arizona, 1961; Ph.D., University of Cincinnati, 1965.
 Experience: Research assistant, University of Arizona; analytical chemist, Federal Food and Drug Administration; teaching assistant, University of Cincinnati; research chemist, North American Aviation; editor, Chemical Abstract Service; chemist, Naval Radiological Defense Laboratory.
- KAY, THOMAS D. (1958)** Welding and Metallurgical Engineering
 B.S., Wayne State University, 1957; M.A., California State Polytechnic College, 1967.
 Experience: Assistant training director, Ex-Cello-O Corporation; apprentice instructor, Chrysler Corporation; radio team chief and refrigeration mechanic, U.S. Army; machinist, Detroit-Timken Axle Company; apprentice, Goodyear Tire and Rubber Company.
- KEECH, ROGER A. (1965)** Mechanical Engineering
 B.S., California State Polytechnic College, 1955; M.S., University of Southern California, 1964.
 Experience: Engineer, Menasco Manufacturing Co., Rocky Mt. Arsenal, Lockheed Aircraft; president, Dynalytic Engineering Co.; instructor, California State Polytechnic College, Pomona.
- KEEP, ROGER L. (1968)** Industrial Technology
 B.S., Church College, 1957; M.S., Stout State University, 1968.
 Experience: Building construction supervisor, Polynesian Cultural Center, Hawaii; foreman, Perkins Machine Company.
- KEETCH, BRENT H. (1967)** Journalism
 B.A., Utah State University, 1965; M.A., 1966.
 Experience: Research aide, Utah State University Forestry Department, U.S. Forest Service; senior assistant, Utah State University; U.S. Army; staff writer, The Salt Lake Tribune; correspondent, newsman, The Associated Press, Utah, Arizona.
- KEIF, RODNEY G. (1960)** Environmental Engineering
 B.S., Kansas State University, 1949; graduate study, California State Polytechnic College.
 Experience: Sales and application engineer, O'Connor-Oklahoma Company, Oklahoma City; registered professional engineer, Oklahoma.

Faculty and Staff

KELLER, ELMO A., JR. (1963) Computer Science and Statistics
B.A., Brigham Young University, 1959; M.A., 1961; Ph.D., University of California at Los Angeles, 1970.

Experience: Assistant instructor, Brigham Young University; instructor, Church College of Hawaii.

KELLERMAN, MARTIN (1968) Chemistry
B.S., Polytechnic Institute of Brooklyn, 1953; Ph.D., University of Washington, 1966.

Experience: Research assistant, Polytechnic Institute of Brooklyn, University of Washington, University of California at San Diego; analytical chemist, Continental Baking Company.

KELLEY, HELEN P. (1966) Journalism
B.P.A., Brooks Institute of Photography, 1966; graduate study, The University of Kansas and San Jose State College.

Experience: Free-lance writing and newspaper work, Arcadia and Preston, Kansas; newspaper work, Arcadia and Preston, Kansas; free-lance photography and writing.

KENNEDY, ROBERT E. (1940) President
A.B., San Diego State College, 1938; M.A., Stanford University, 1950; Ph.D., Claremont Graduate School, 1966.

Experience: Editorial Staff, San Diego Sun, San Diego Daily Journal, San Luis Obispo Telegram-Tribune, Palo Alto Times; at California State Polytechnic College: Chairman, Journalism Department; Director of Public Relations; Assistant to the President; Dean, Arts and Sciences; Vice President.

KENNELLY, BRUCE (1947) Head, Chemistry Department
B.S., University of Kentucky, 1944; M.S., Purdue University, 1946; Ph.D., Cornell University, 1952.

Experience: Chemist, department of agricultural chemistry, Purdue University; research chemist, department of biochemistry and nutrition, Cornell University.

KENYON, PAUL (1957) Business Administration
LL.B., Southern Methodist University law school, 1949; M.A., California State Polytechnic College, 1959.

Experience: Insurance legal staff, investment counseling, methods analyst, and business systems and procedures analyst.

KERR, JOHN F. (1967) English
B.A., Arkansas State University, 1953; M.A., University of Michigan, 1956; Ph.D., University of Texas, 1964.

Experience: High school journalism and speech teacher, Missouri; assistant professor, Westminster College, Missouri; instructor, University of Missouri; teaching assistant, University of Texas; assistant professor, Louisiana State University.

KIMBALL, KENNETH R. (1967) Industrial Technology
B.E., University of Southern California, 1956; M.S., 1959; B.S., 1965.

Experience: Resident engineer and executive officer, Engineer District; member, War Department General Staff; chief of management branch, Major Air Command; air installation officer and wing staff engineer; member of technical staff and supervisor of Electronics Manufacturing, Hughes Aircraft; industrial engineer, chief of overhaul and repair, engineering group leader, Autonetics; manufacturing manager, California Steel and Tube; general manager, Climax Manufacturing; head, plant maintenance, and chief, industrial engineering, Rocketdyne; staff consultant, H. B. Maynard and Company. Registered professional engineer.

KNAPP, ERNA BOWMAN (1962) Art
M.F.A., Otis Art Institute, Los Angeles, 1961.

Experience: Instructing designer, Foremost Studio, New York City; Headon Designers, London and Manchester, England; owner and operator of commercial design studio, Montreal, Canada; freelance designer, Los Angeles; fine arts instructor, private schools, art associations, Los Angeles.

Faculty and Staff

- KOBERG, DONALD J. (1962)**.....Architecture
B.Arch., Tulane University, 1958; M.Arch., University of Washington, 1970.
Experience: Architectural practice as designer and draftsman in New Orleans; instructor, North Dakota State College; lecturer, University of California at Berkeley; research associate, Architectural Prototypes, Berkeley; Corps of Engineers, U.S. Army. Registered architect, Louisiana.
- KOGAN, IRVIN J. (1957)**.....Engineering Technology
B.A., Wayne University, 1954; M.A., Stanford University, 1955. Additional graduate study, Stanford University.
Experience: Instructor, Orange Coast College; U.S. Air Force.
- KOMBRINK, RICHARD T. (1955)**.....Engineering Technology
A.B., Loyola University, 1946; B.S.M.E., University of Southern California, 1964.
Experience: Pilot, U.S. Army Air Corps; draftsman, Hess Greiner, and Polland; sales engineer, T. H. Creears Corp.; civil designer, City of Culver City; assistant project engineer, RCA Radar and Missile Division.
- KORSMEYER, RUSSELL (1958)**.....Electrical Engineering
B.S.E.E., University of Missouri, 1950; M.S.E.E., University of Southern California, 1958.
Experience: Electrical engineer, Los Angeles Department of Water and Power; junior design engineer, North American Aviation, Inglewood; relay engineer, Gulf States Utilities, Beaumont, Texas. Registered professional engineer, California.
- KOURAKIS, JOSEPH M. (1970)**.....Architecture
B.A. Arch., University of Illinois, 1954; M.A. Arch., University of Illinois, 1957; M.A. CRP, University of California, Berkeley, 1961.
Experience: Self employed, Berkeley; project manager, Architect/planner, Wisler Patri, San Francisco; planning officer for physical planning, Redevelopment Agency, City of Oakland; senior architectural designer and urban planner, Wilsey, Ham & Blair, San Mateo; assistant planner, Oakland City Planning Department; military installations planner, 12th Naval District. Registered architect, California.
- KREJSA, RICHARD J. (1968)**.....Biological Sciences
B.S., Michigan State College, 1954; M.A., University of California, Los Angeles, 1958; Ph.D., University of British Columbia, Vancouver, 1964.
Experience: Instructor and assistant professor, Western Washington State College, University of Hawaii, Columbia University.
- KRUPP, WILLIAM E. (1969)**.....Engineering Technology
B.S., University of California, Berkeley, 1942; M.S., Stanford University, 1955; additional graduate work, University of California, Santa Cruz.
Experience: Engineering Aid, Standard Oil Company of California; Captain, U.S. Army Corps of Engineers; construction, self-employed; test engineer, North American Aviation; staff engineer, Sandia Corporation, Albuquerque, New Mexico; engineer, North American Aviation, Santa Susana; engineer, Coleman Engineering Company, Hurricane, Utah; staff engineer, Lockheed Missile and Space Company, Santa Cruz and Sunnyvale; instructor Monterey Peninsula College, Monterey and Cabrillo College, Santa Cruz.
- KURTZ, WILLIAM B. (1971)**.....Natural Resources Management
B.S., New Mexico State University, 1963; M.S., 1966.
Experience: Range conservationist, Soil Conservation Service, U.S.D.A.; Graduate research assistant, New Mexico State University; Graduate research associate, University of Arizona; Project economist, Daniel, Mann, Johnson and Mendenhall; Senior economist, VTIN—Orange County.
- LABAR, GEORGE W. (1970)**.....Biological Sciences
B.S., Wisconsin State University, 1964; M.S., Idaho State University, 1967; Ph.D., Montana State University, 1970.
Experience: Teacher, Crandon High School; graduate teaching assistant, Idaho State University; research assistant, Montana State University; lecturer, Fresno State College.

Faculty and Staff

- LABHARD, LEZLIE A. (1967)** Home Economics
B.S., University of California, 1965; M.S., 1967.
Experience: Resident assistant, laboratory assistant, research assistant, University of California, Davis.
- LAKE, ROBIN (1970)** Speech
B.A., University of British Columbia, 1964; graduate study, Stanford University.
Experience: Teaching assistant, Stanford University; director, actor, stage manager with various resident companies in Canada and the United States. Member, Actors' Equity.
- LAMBERT, ROYCE L. (1969)** Soil Science
B.S., Purdue University, 1964; M.S., 1966; Ph.D., 1969.
Experience: Farm operator; welder; warehouse manager, building products; graduate teaching and research assistant, Purdue University.
- LAMOURIA, LLOYD H. (1965)** Head, Agricultural Engineering Department
B.S., Michigan State University, 1949; M.S., Iowa State University, 1950.
Experience: U.S. Air Force; instructor, Iowa State University; associate professor and associate agricultural engineer, University of California; manager of product planning, J. I. Case Company, Racine, Wisconsin.
- LANDRETH, JAMES R. (1956)** Director, Business Affairs
B.A., Mexico City College, 1954; M.B.A., Stanford University, 1956; additional graduate study, Claremont University College.
Experience: Instructor, U.S. Army; explosive ordnance disposal, U.S. Army; college personnel officer, assistant to dean of the college, California State Polytechnic College, Kellogg campus; personnel relations and business management analyst, San Luis Obispo.
- LANDWEHR, ALFRED W. (1970)** English
B.A. University of Missouri, 1963; M.A., 1964; Ph.D., 1970.
Experience: Instructor, Northern Arizona University; University of Missouri.
- LANDYSHEV, ALEXANDER (1956)** Electrical Engineering
E.E., University of Vladivostok, Russia, 1927; additional study, University of Leningrad, 1935; University of Moscow, 1940, University of California, 1954 and 1956.
Experience: Electrical engineer, Donez Basin Power System, Russia; Energiebauost G.m.b.H., Germany; Brown-Voveri and Co., Germany; U.S. Army Engineers, Germany; U.S. Steel Corp., San Francisco; production engineer, Precision Manufacturing Co.; associate professor, University of California, Berkeley.
- LANE, BOBBIE A. (1970)** Men's Physical Education
B.S., Baylor University, 1963; graduate study, Baylor University, San Diego State College, Central Washington State College.
Experience: Player, San Diego Chargers football club; physical education instructor and coach, Yakima Valley Community College; head football coach, University of California, San Diego.
- LANG, MARTIN T. (1969)** Mathematics
B.A., North Central College, 1959; M.A., The University of Kansas, 1963; additional graduate study.
Experience: Teaching assistant, assistant instructor, University of Kansas; assistant professor, San Diego State College.
- LANGFORD, JAMES A. (1955)** Coordinator, Elementary Education
A.B., Western Kentucky Teachers College, 1937; M.A., 1947; Ph.D., University of Michigan, 1953.
Experience: Teacher in elementary and secondary schools in Kentucky; principal, Cromwell, Kentucky; principal, Jefferson Elementary School, Wayne, Michigan; assistant professor and supervisor of elementary education, University of Nevada; communications officer, U. S. N. R.

Faculty and Staff

- LANGFORD, W. REED (1969)**.....Physics
 B.S., Utah State University, 1954; M.S., Michigan State University, 1960; additional graduate work, Brigham Young University.
 Experience: Teaching assistant, Utah State University and Brigham Young University; officer, U.S. Army; research assistant, Michigan State University and Brigham Young University; project engineer, Sperry Utah Company.
- LANSMAN, PAUL S. (1964)**.....Mathematics
 A.B., M.A., Washington University, 1932; Ph.D., 1934; additional graduate study, California Institute of Technology.
 Experience: Instructor, St. Louis Junior College; mathematician, Subterrex Geophysical Company, Airborne Instruments Laboratory and Stoddart Aircraft Radio Company; engineer, Lockheed Corporation; Lawson Crystal Company and Lawson Import Company.
- LARSEN, STUART E. (1969)**.....Aeronautical Engineering
 B.S., University of Cincinnati, Cincinnati, Ohio, 1963; M.S., 1965; M.S. Eng., Arizona State University, Tempe, Arizona, 1969.
 Experience: Engineering Aide, Bell Aerospace Systems, Niagara Falls, New York and Republic Aviation, Farmingdale, New York; test engineer, Hypersonic Aerodynamic Research Group, University of Cincinnati; design engineer, General Electric, Flight Propulsion Division, Evendale, Ohio; consulting engineer, Dynamic Science AVSER, Deer Valley, Arizona; faculty associate, Arizona State University, Tempe, Arizona.
- LARSON, LOIS L. (1962)**.....Graduate Nurse
 R.N., Swedish Hospital, School of Nursing, Minneapolis, Minnesota.
 Experience: General duty, office nurse.
- LASCOLA, RUSSELL A. (1970)**.....Philosophy
 B.A., California State College at Los Angeles, 1962; M.A., University of Southern California, 1964; Ph.D., 1969.
 Experience: Teaching assistant, University of Southern California; lecturer, Mt. Saint Mary's College; instructor, Glendale College, Los Angeles City College; educational consultant, Educational and Youth Opportunities Agency, Los Angeles.
- LAUMANN, GEORGE C. (1957)**.....Mathematics
 A.B., Chico State College, 1952; M.A., 1953; additional graduate study, University of Oregon, University of California at Los Angeles.
 Experience: Instructor, Ordnance Department, United States Army; teacher, California high schools; instructor, Adult Evening College, Chico; participant, National Science Foundation Institute, Portland State College.
- LAWSON, JOHN D. (1951)**.....Director, Activities
 B.S., University of California, Berkeley, 1938; M.Ed., University of California, Davis, 1955; Ed.D., Stanford University, 1963.
 Experience: Vocational instructor; officer, U.S. Navy; special supervisor, State Bureau of Agricultural Education.
- LE DOUX, NIKKI A. (1970)**.....Graduate Nurse
 R.N., St. Lukes School of Nursing, San Francisco, California, 1967.
 Experience: Highland Hospital, Oakland, California; Contra Costa County, Martinez, California; San Luis Obispo General Hospital.
- LEE, THOMAS J. (1952)**.....Men's Physical Education
 B.A., San Jose State College, 1949; M.A., Stanford University, 1950.
 Experience: Player-coach, All-American Professional Basketball Team; instructor, private gymnasium, Oakland; playground director, Hayward Recreation District; U. S. Army.
- LEIGHTY, RAYMOND V. (1957)**.....Soil Science
 B.S., University of Maryland, 1938; M.S., 1940.
 Experience: Supervisory soil scientist (Land Classification and Survey), USDA, Soil Conservation Service, Kentucky; party chief, SCS, Virginia, Georgia. U. S. Army, CE.

Faculty and Staff

- LEONG, KINGSTON L. (1970)** Biological Sciences
B.S., University of Hawaii, 1963; M.S., 1966; Ph.D., Oregon State University, 1970.
Experience: Research assistant, University of Hawaii and Oregon State University; termite control advisor, Fumaseal-Honolulu.
- LEVISON, ROBERT L. (1969)** Education
B.S., Southern Oregon College, 1963; M.Ed., University of Wyoming, 1966; additional graduate study, New Mexico State University.
Experience: High school teacher, Central Point, Oregon; high school counselor, McKinleyville, California; counselor, New Mexico State University; psychometrist counselor, La Tuna Federal Prison, La Tuna, Texas.
- LEWELLYN, LOUIS W. (1957) (1961)** Counselor
A.B., University of Arkansas, 1933; M.A., Stanford University, 1950.
Experience: Office manager, Standard Brands Co.; business manager, Southern Pictorial News; personnel training supervisor, Lansburgh and Bros; officer, U.S. Navy; counselor, San Francisco Unified School District; associate dean (counseling and testing), California State Polytechnic College, San Luis Obispo.
- LEWIS, GEORGE M. (1967)** Mathematics
B.A., Stanford University, 1961; M.A., University of Southern California, 1964; Ph.D., University of Southern California, 1970.
Experience: Instructor, San Fernando Valley State College; teaching, research assistant and instructor, University of Southern California.
- LEWIS, VANCE D. (1946)** Associate Dean, School of Science
and Mathematics
A.B., University of California, 1933; M.A., 1940; Ph.D., University of Southern California, 1954; additional graduate study, University of New Mexico, University of Washington, Rensselaer Polytechnic Institute.
Experience: Laboratory technician, Shell Development Company; instructor and administrator, California secondary schools; summer staff member, physics institute, University of New Mexico; instructor, California State Polytechnic College; U.S. Naval Aviation officer.
- LINDAMOOD, CHARLES H. (1958)** Foreign Language and Linguistics
B.A., University of Minnesota, 1949; M.A., Columbia University, 1951; additional graduate study, University of Minnesota, Stanford University, 1957.
Experience: Teacher, high school, Salinas; instructor, University of Minnesota, College of Puget Sound, and Taft College, Ft. Ord, Ft. Lewis and McChord Field, Washington.
- LINDSAY, WILLIAM B. (1968)** Electronic Engineering
B.S., Morningside College, 1941; M.S.E.E., University of Wisconsin, 1953; E.E., Stanford University, 1961; graduate, U.S. Army Command and General Staff College, 1964.
Experience: Officer, U.S. Army radar maintenance; instructor, Armed Forces Special Weapons Project; nuclear effects engineer; Signal Operations Officer, Eighth U.S. Army (Korea); R&D program manager, Office of the Secretary of Defense; Signal Battalion Commander; Director of Operations, U.S. Army Strategic Communications Command, Europe; Chief, Office of Communications-Electronics, U.S. Army Materiel Command.
- LINT, ROBERT G. (1967)** Foreign Language and Linguistics
B.A., University of Michigan, 1948; M.A., 1950; Ph.D., Ohio University, 1967.
Experience: High school teacher, Michigan, Washington; instructor, Lower Columbia College; teaching fellow, instructor, assistant professor, Ohio University.
- LITCHFIELD, PETER M. (1970)** Psychology
B.A., University of Michigan, 1963; M.A., San Diego State College, 1967; additional graduate study, University of Portland.
Experience: Part-time English instructor, Centro Cultural-San Jose, Costa Rica; owner, guitar importing firm, Ann Arbor, Michigan; owner, truck firm, Guatemala and Costa Rica; partner, Quality Latin Imports, San Diego; social worker, County of San Diego; laboratory instructor and research assistant, University of Portland.

Faculty and Staff

- LOPER, WILLARD H. (1955)** Agricultural Engineering
B.S., New York College of Agriculture, Cornell University, 1953.
Experience: Dairy and general farming, New York; machinist, Westinghouse Electric Corp., Buffalo, New York; mechanic-welder, New York State College of Agriculture, Cornell University; student assistant instructor, Cornell University; salesman, Holz Co., Ukiah; journeyman welder, draftsman, Cochran Equipment Company, Salinas.
- LOUGHRAN, BERNICE B. (1958)** Head, Art Department
B.S., Newark State Teachers College, 1940; M.A., Ohio State University, 1946; Ed.D., Stanford University, 1958.
Experience: Elementary school teacher, Southbury, Conn., Santa Barbara, California, and Redwood City, California; elementary art teacher, Irvington, New Jersey; art instructor, Johnson Teachers College, University of Connecticut and Danbury Teachers College.
- LOWRY, JOHN J. (1962)** Mathematics
B.S., United States Military Academy, West Point, 1947; M.A., California State Polytechnic College, 1963; M.S., University of Illinois, 1967.
Experience: Officer and navigation instructor, U.S. Air Force; engineer, Boeing Company.
- LUBICZ-NYCZ, JAN (1970)** Architecture
Diploma of Architecture, Polish University College, School of Architecture, London, England, 1954.
Experience: Design critic, John S. Bolles, San Francisco; professor, Massachusetts Institute of Technology; lecturer, University of Virginia and University of California, Berkeley; self-employed. Registered architect, United Kingdom and California.
- LUCIN, JOHN J. (1966)** Activities Adviser
B.A., University of Washington, 1966; M.A., California State Polytechnic College, 1969.
- LUKES, THOMAS M. (1962)** Food Industries
B.S., San Jose State College, 1947; M.S., University of California at Berkeley, 1949.
Experience: Microbiologist for Real Gold Citrus Products, Anaheim; laboratory supervisor, Gentry Division of Consolidated Foods, Gilroy.
- LUSCHEI, MARTIN L. (1969)** English
B.A., Nebraska Wesleyan University, 1952; M.F.A., University of Iowa, 1960; Ph.D., University of New Mexico, 1970.
Experience: Instructor, U.S. Army, Japan, University of Iowa, University of Texas; assistant cultural affairs officer, U.S. Information Service, Colombia.
- LUTRIN, CARL E. (1970)** Social Sciences
B.A., Adelphi University, 1962; M.S., University of Wisconsin, 1965; additional graduate study, University of Missouri.
Experience: Instructor, Kellogg Community College; assistant instructor, University of Missouri.
- MACDONALD, LACHLAN P. (1968)** Director, Information Services/English
M.A., University of Chicago, 1957.
Experience: Journalist: Daily Mining Gazette, Michigan; Anchorage Daily Times, Alaska; Associated Press Seattle Bureau; KBYR, Alaska; City News Service, Los Angeles; public information: U.S. Army, Alaska; Alaska National Guard; editor: Chicago Review, Coastlines, The Humanist; lecturer, University College, University of Chicago; teacher, Webb School of California; at California State Polytechnic College, Kellogg-Voorhis, news bureau director, associate professor and journalism coordinator, director of information services; free-lance writer and photographer.
- MACH, GEORGE R. (1954)** Mathematics
B.A., Iowa State Teachers College, 1950; M.S., State University of Iowa, 1951; Ph.D., Purdue University, 1963.
Experience: National Science Foundation faculty fellow, Purdue University; graduate teaching assistant, Purdue University; visiting professor, National Science Foundation Summer Institute, Washburn University, Kansas; officer, U.S. Navy.

Faculty and Staff

- MacKENZIE, F. HELEN (1966)**.....Library
 B.A., University of California, Berkeley, 1941; Certificate of Librarianship, 1943; M.A., University of Denver, 1961.
 Experience: Librarian, Mary Holmes Junior College, West Point, Mississippi; cataloger, Los Angeles County Law Library, University of Dubuque Seminary Library, California State Library, Sutro Branch, San Francisco, California.
- MADDEN, BRUCE E. (1970)**.....Food Industries
 B.S., California State Polytechnic College, San Luis Obispo, 1968.
 Experience: Supervisor, Planning and Scheduling, Campbell Soup Company, Modesto; U.S. Navy.
- MAGER, HANS L. (1949)**.....Architecture
 M.S., Royal University of Technology, Sweden, 1947.
 Experience: Structural engineer, Building Concern; H.S.B., Stockholm, Sweden; consulting engineer with architects and engineers in Southern and Central California. Registered professional engineer, California and Sweden.
- MAGNESS, CAROLYN M. (1968)**.....Mathematics
 B.A., Merrimack College, 1966; M.S., Northern Arizona University, 1968.
 Experience: Secretary, Massachusetts Institute of Technology; mathematician, U.S. Geological Survey, Flagstaff, Arizona; teaching assistant, Northern Arizona University.
- MAGUR, LEON W. (1958)**.....Physics
 B.S., California State Polytechnic College, 1958; graduate study, California State Polytechnic College; additional graduate studies, University of California, Berkeley and Davis.
 Experience: Electronic technician.
- MAKIN, LOIS C. (1966)**.....Library
 B.A., University of California, Berkeley, 1930; Certificate of Librarianship, Library School of the Los Angeles Public Library, 1931; School Librarianship Certificate, UCLA, 1937.
 Experience: Branch Library, Oakland, Bookmobile and branch librarian, Honolulu, Hawaii; Librarian, Elementary Schools, Long Beach, California; humanities reference librarian, San Jose State College.
- MAKSOUDIAN, Y. LEON (1963)**.....Computer Science & Statistics
 B.S., California State Polytechnic College, 1957; M.S., University of Minnesota, 1961; Ph.D., University of Minnesota, 1970.
 Experience: Instructor, Westmont College, Northwestern College; teaching assistant and instructor, University of Minnesota; junior development engineer, Minneapolis Honeywell Company.
- MALMBORG, FREDRICK B. (1969)**.....Mechanical Engineering
 B.S., New York University, 1955; M.S. Columbia University, 1966.
 Experience: Mathematician, Harvard University; engineer, North American Aviation, Inc. and United Nuclear Corporation, Elmsford, New York; assistant professor, Rochester Institute of Technology, Rochester, New York.
- MANNING, JOHN H. (1956)**.....Mathematics
 A.B., Oakland City College, 1937; M.A., University of Cincinnati, 1939; D.Ed., Pennsylvania State University, 1954.
 Experience: Instructor in secondary schools of Ohio and Pennsylvania; U. S. Army Signal Corps; professor at Mansfield, Pennsylvania, State Teachers College.
- MARKOS, HARRY G. (1968)**.....Dairy Science
 B.S., Utah State University, 1963; M.S., University of Illinois, 1966; Ph.D., University of Illinois, 1968.
 Experience: Research and teaching assistant, University of Illinois.

Faculty and Staff

- MARTINEZ, ANGELINA (1966)**.....Library
 B.A., Inter-American University, San German, Puerto Rico, 1943; B.S., Louisiana State University, 1945; M.S., University of Illinois, 1957.
 Experience: Assistant Librarian, Inter-American University; Cataloger Pan-American Union, Organization of American States; head librarian, Inter-American Institute of Agricultural Sciences of the Organization of the American States, Costa Rica; head reference librarian, University of California, Davis; director of reader services, Nevada State Library.
- MATHENY, ROBERT (1952)**.....Supervisor of Transportation
 B.S., California State Polytechnic College, 1962.
 Experience: International Harvester Company, Des Moines, Iowa; diesel and heavy duty machinery mechanic, Army Air Corps; dealer and sales, Allis Chalmers, Point Arena.
- MAUGHAN, SCOTT J. (1965)**.....History
 B.A., Brigham Young University, 1957; M.A., University of Utah, 1959; Ph.D., 1968.
 Experience: Instructor, Eastern Montana College, University of Utah; U.S. Army.
- MAYO, EDWARD L. (1968)**.....History
 B.A., Claremont Men's College, 1959; M.A., 1966; B.F.T. American Institute for Foreign Trade, 1962; Ph.D., Claremont Graduate School, 1969.
 Experience: Securities analyst, Title Insurance and Trust Company; sales representative, Western Airlines; instructor, Pitzer College, Mt. San Antonio College.
- MCCALEB, DONALD L. (1962)**.....Public Information Specialist
 B.S., Los Angeles State College, 1958; graduate study, Los Angeles State College.
 Experience: Public information, U.S. Air Force; film representative and office manager, Billy Graham Films, North Hollywood; teaching and public relations, Marysville Union High School; director of public relations, associated students of Los Angeles State College.
- McCLUNG, PHILLIP T. (1968)**.....Education
 B.A., Oklahoma Baptist University, 1955; M.R.E., Golden Gate Baptist Theological Seminary, 1959; M.A., Teachers College, Columbia University, 1960; Ed.D., 1966.
 Experience: Junior high school teacher, Sacramento; head, Division of Education and Psychology, Grand Canyon College, Phoenix.
- MCCOMBS, JOHN W. (1960)**.....Electronic Engineering
 B.S., Clemson University, 1950; B.S.E.E., 1957; M.S.E.E., 1961; additional graduate study, Worcester Polytechnic Institute, Arizona State College.
 Experience: High school teacher, Greenwood, S.C.; instructor, Clemson University; engineer, Greenwood Mills, Lockheed Aircraft Corp., Autonetics, Inc.
- MCCORKLE, ROBERT E. (1962)**.....Agricultural Management
 B.S., California State Polytechnic College, 1960; M.S., University of California, 1962; additional graduate study, Oregon State University, University of Wisconsin.
 Experience: Research statistician, Department of Agricultural Economics, University of California; research assistant, Farm Economics Division, Economic Research Service, United States Department of Agriculture; Chief of Party, U.S. Agency for International Development project, Zambia; chief farm management officer, Ministry of Agriculture, Lusaka, Zambia.
- MCCORMAC, WESTON A. (1968)**.....Business Administration
 B.A., Golden Gate College, 1967; M.B.A., 1968.
 Experience: Account executive, Merrill Lynch, Pierce, Fenner & Smith; instructor in public speaking, teaching techniques, personnel management, planning methods and leadership, Ft. Sill Artillery School; manpower and administrative analyst, Office of Assistant Secretary of Defense (Manpower); executive officer for Chief of Public Information of the Army, Washington, D.C.; director of Army Personnel Management Program; Commanding Officer of the Army Personnel Center at Oakland Army Base.

Faculty and Staff

- McDOUGAL, KAREN SUE (1969)**.....Home Economics
 B.S., University of Georgia, 1964; M.S., 1967.
 Experience: Assistant professor and research technician, University of Georgia and Georgia Experimental Station.
- McGONAGILL, WILLARD L. (1967)**.....Architecture
 B.S., Colorado University, 1955; B. Arch., 1956.
 Experience: Associate, Weaver & Drover, Architects; project manager, Kerr-Beggs, Architectural Engineers; draftsman, Blakey Architects, Langhart Architect.
- McGRATH, JAMES M. (1946)**.....Head, Engineering Technology Department
 B.A., Santa Barbara State College, 1941; M.A., California State Polytechnic College, 1953.
 Experience: Chief, U.S. Army Transport Service; superintendent of machinery, U.S. Naval Yard, Manila; officer, U.S. Navy; consultant, USAID, Africa.
- McKINSTRY, JOHN A. (1968)**.....Social Sciences
 A.B., University of California, Los Angeles, 1961; A.M., University of Southern California, 1963; Ph.D., University of Southern California, 1970.
 Experience: Teacher, Venice High School; instructor and Assistant to Dean of Men, University of Southern California.
- McMEEN, GEORGE H. (1960)**.....Mathematics
 B.A., Western Washington College of Education, 1934; M.Ed., University of Washington, 1947; Ed.D., Columbia University, 1953.
 Experience: Elementary, junior high, junior college, and state college teaching; air navigation officer, U.S. Navy; professor and chairman, mathematics department, Newark State College, Newark, New Jersey; Special Consultant in Mathematics, California State Department of Education, 1961-62.
- McMORRAN, WAYNE E. (1962)**.....Electronic Engineering
 B.S., California State Polytechnic College, 1960; M.S.E.E., New York University, 1962.
 Experience: Technician, Western Electric Company, Shell Development Company; member of the technical staff, Bell Telephone Laboratories, Murray Hill, New Jersey; electronics engineer, Lawrence Radiation Laboratory, Livermore, California and Jet Propulsion Laboratory, Pasadena.
- McNEAL, LYLE G. (1969)**.....Animal Science
 B.S., California State Polytechnic College—Kellogg, 1964; M.S., University of Nevada, 1966; Additional graduate study, Utah State University.
 Experience: Agricultural Extension Agent, University of Nevada Cooperative Extension Service, Gardnerville, Nevada; Graduate Research Assistant in Animal Breeding, University of Nevada; Ranching operations in Nevada, Montana, and Utah; Assistant Manager, Riding Stable, Agoura, California.
- McRAE, GLENN G. (1963)**.....Counselor
 A.B., University of Tampa, 1949; M.Ed., University of Florida, 1954; D.Ed., 1959.
 Experience: Graduate assistant, fellow, teaching assistant, University of Florida; instructor, St. Petersburg Junior College; visiting summer lecturer, Mississippi State University, Louisiana State University, Northwest Louisiana State College, and State College of Iowa.
- McROBBIE, J. M. (1962)**.....Head, Industrial Technology Department
 A.B., San Jose State College, 1950; M.A., San Diego State College, 1955; Ed.D., Colorado State College, 1963; additional graduate study, Purdue University, 1967.
 Experience: Patternmaker, The Boeing Company, Seattle; trade-technical instructor and civilian personnel recruiter, Puget Sound Naval Shipyard, Bremerton; industrial arts teacher, Santa Clara County; industrial arts teacher-consultant, San Diego County Schools; coordinator of industrial education, Tulare County Schools.
- MEARES, CANDACE J. (1969)**.....Graduate Nurse
 R.N., University of San Francisco, 1969.
 Experience: San Joaquin Community Hospital, Bakersfield.

Faculty and Staff

- MENDENHALL, CHARLES E. (1967)**..... Director, Alumni Affairs
Experience: Reporter-printer, Livermore, Calif., Herald; personnel clerk, US Army; public relations director, Stockton, Calif.; Union Stock Yards; farm editor, The Modesto, Calif., Bee.
- MENG, SHIEN YI (1968)**..... Electrical Engineering
B.S., Taiwan Provincial Cheng Kung University, 1953; M.S., Oklahoma State University, 1958; Ph.D., Ohio State University, 1968.
Experience: Research associate, Ohio State University; research assistant, Cornell University; engineer, Taiwan Provincial Government.
- MERRIAM, JOHN L. (1958)**..... Agricultural Engineering
B.S., California Institute of Technology, 1938; graduate study, California Institute of Technology.
Experience: Instructor, California Institute of Technology; junior civil engineer, U. S. Army Engineers and private consulting engineers; civil area engineer, Soil Conservation Service, USDA; senior irrigation engineer, Ministry of Agriculture, Kingdom of Saudi Arabia; consulting irrigation engineer, The Ralph M. Parsons, Co., Egypt UAR; Institute Fomento Nacional de Nicaragua, and Food and Agricultural Organization, Riyadh, Saudi Arabia; irrigation engineer, California State Polytechnic College Project, USOM, Thailand.
- MESLER, FLORENCE (1962)**..... Graduate Nurse
R.N., Patterson General Hospital, New Jersey, 1939.
Experience: Industrial nurse, Wright Aero Corporation, Patterson, New Jersey; general duty nurse, Santa Monica Hospital, and French Hospital, San Luis Obispo; private duty, San Luis Obispo.
- MEYER, THOMAS O. (1955)**..... Food Industries
B.S., State College of Washington, 1949; M.S., 1953.
Experience: Instructor and meats specialist, State College of Washington; assistant animal husbandman, Experiment Station, State College of Washington, Pullman, Washington.
- MICHEL, ELIZABETH (1961)**..... Physical Therapist
B.A., University of Colorado, 1946; Physical Therapy Certificate, University of Kansas, 1947.
Experience: Tucson Medical Center, Arizona; Kabat Kaiser Institute, Vallejo; Mills Memorial Hospital and San Mateo Clinic, San Mateo; University of Utah, Salt Lake City.
- MILES, HERBERT L. (1963)**..... Electrical Engineering
B.S.E.E., Wayne State University, 1950; M.S.E.E., 1963; additional graduate study, Colorado State University.
Experience: Draftsman, Detroit Edison Co., City Engineer's Office; personnel recruiter and trainer, City of Detroit Civil Service Commission; instructor, Ferris State College; assistant professor, Wayne State University; registered professional engineer, California and Michigan.
- MILLER, ALLEN D. (1960)**..... Mathematics
B.S., Iowa State University, 1945; M.S., 1948; Ph.D., 1953.
Experience: High school mathematics teacher, Iowa, Nebraska, Wisconsin, and California; college mathematics teacher, Wisconsin, Illinois, Iowa and California; research development in industry, Hughes Aircraft Company; participant in National Science Foundation institutes, Stanford University, Bowdoin College, University of Arizona, University of Southwest Louisiana, Columbia University.
- MILLER, ERNEST C. (1968)**..... Business Administration
B.A., University of Chicago, 1941; M.B.A., 1946; Ph.D., University of Denver, 1954.
Experience: Supervisor, sales promotion, U.S. Rubber Company; director of personnel, comptroller, O. P. Baur Conf. Corp., Denver; part-time instructor, University of Denver; assistant general manager, Western Reddi-Wip Company; lecturer, University of Alaska and George Washington University; Lt. Colonel, U.S. Air Force.

Faculty and Staff

- MILLER, HAROLD R. (1968)**.....Business Administration
B.S., University of Missouri, 1958; M.S., 1959.
Experience: First Lieutenant, U.S. Air Force; staff accountant, Williams, Keepers, Oliver, Payne & Rackers, CPA's, Columbia, Missouri; comptroller, Ozark Tractor and Implement, Springfield; instructor, Southwest Missouri State College.
- MILLER, JEANNE (1961)**.....Graduate Nurse
R.N., St. Alexius Hospital, Bismarck, North Dakota, 1944.
Experience: Mountain View Hospital and French Clinic, San Luis Obispo.
- MILLER, RICHARD E. (1970)**.....Counselor
B.S., Eastern Michigan University, 1954; Th.D., Northern Baptist Theological Seminary, 1958; M.A., Michigan State University, 1963; Ph.D., 1968.
Experience: High school instructor, Walled Lake, Michigan; Director of Christian Education, Chicago, Illinois; international student adviser, director, Institute of International Education Orientation Center for Foreign Student Scholars, assistant professor, Michigan State University; director, World Affairs Seminars; International Programs, Michigan State University.
- MILLER, RICHARD M. (1967)**.....Pharmacist
Graduate in Pharmacy, University of Southern California, 1920.
Experience: Forty-eight years registered pharmacist.
- MISIC, DRAGOSLAV M. (1970)**.....Environmental Engineering
Diploma Engineer, University of Ljubljana, Yugoslavia, 1957; M.S., Ph.D., Northwestern University, Evanston, Illinois, 1963.
Experience: Research engineer, Whirlpool Corporation, Benton Harbor, Michigan; research associate, B.A.S.F., Western Germany.
- MOIR, NEIL J. (1970)**.....Chemistry
B.S., Lewis and Clark College, 1962; M.S., University of Oregon Medical School, 1966; Ph.D., 1968.
Experience: Graduate teaching instructor, University of Oregon Medical School; post doctoral fellow and research associate, Cornell University.
- MONTGOMERY, DAVID H. (1956)**.....Biological Sciences
B.S., California State Polytechnic College, 1954; M.A., College of the Pacific, 1956; additional graduate study, Friday Harbor Laboratories, University of Washington and University of California.
Experience: Laboratory assistant and teaching assistant, California State Polytechnic College; teaching fellow, College of the Pacific; summer faculty, Pacific Marine Biological Station, University of the Pacific; National Science Foundation fellow, Friday Harbor Laboratories; National Science Foundation fellow, University of California.
- MOORE, LARRY D. (1967)**.....Electronic Engineering
A.B., Centre College, 1936; M.S., U.S. Naval Postgraduate School, 1951.
Experience: Officer, U.S. Navy, 1946-67; teacher, Ashland Senior High School.
- MOREY, KRISHNAKUMAR S. (1970)**.....Home Economics
B.S., Nagpur University, India, 1955; M.S., 1958; M.S., U.C. Medical Center, San Francisco, 1963; Ph.D., University of California, Berkeley, 1967.
Experience: Research scholar, Nagpur University; teaching assistant, University of California Medical Center; graduate biochemist, teaching assistant, University of California, Berkeley; research associate, Temple University Medical School, Philadelphia.
- MORGAN, DONALD E. (1968)**.....Head, Industrial Engineering Department
B.S., Oregon State College, 1940; M.S., Stanford University, 1962; Ph.D., 1963.
Experience: Staff technical consultant, ARINC Research Corporation; staff member and partner, Decision Studies Group; professor, Stanford University; manager and partner, Intermountain Surgical Supply Company; engineer, Westinghouse Electric Corporation. Registered professional engineer, California.

Faculty and Staff

MORGAN, RONALD R. (1970) Architecture
B.A. Arch., University of California, Berkeley, 1966; M.A. Arch., University of Pennsylvania, 1969.

Experience: Project designer, Daniel, Mann, Johnson & Mendenhall; designer, Francis, Cauffman, Wilkinson & Pepper, Philadelphia; designer/draftsman, John L. Reid, San Francisco; various offices in San Francisco area.

MORRIS, DONALD M. (1957) (1969) Associate Dean, Continuing Education
B.S., M.A., California State Polytechnic College, 1953-1958; EdD., University of California at Los Angeles, 1968.

Experience: Resident supervisor-counselor and assistant personnel analyst, California State Polytechnic College; officer and pilot, U.S. Navy; instructor, University of California, Santa Barbara Extension Division; director of adult and summer schools, San Luis Obispo and Simi Valley Unified School Districts; instructor, assistant dean of instruction and coordinator community services, Moorpark College.

MORRIS, HAROLD D. (1965) Agricultural Management
B.S., Utah State University, 1953; M.S., 1965.

Experience: Vocational agriculture teacher; county agriculture agent; A.S.C. office manager; commercial pilot and flight instructor; air traffic controller, FAA; research assistant, Utah State University Experiment Station; officer, U.S. Air Force.

MOTT, JOHN H., SR. (1967) English
B.A., Southern Oregon College, 1962; M.A., California State Polytechnic College, 1965; additional graduate study, University of California, Colorado State College.

Experience: Special agent, U.S. Military Forces; art instructor, Boise Junior College; high school English and art teacher, Oregon, California; graduate assistant, Colorado State College.

MOTT, ROBERT A. (1946) Head, Men's Physical Education
Department

B.S., University of Akron, 1938; M.A., University of Southern California, 1946; Ed.D., Stanford University, 1953.

Experience: Physical education instructor and athletic coach, Akron Public School System; officer, U.S. Navy; teaching assistant, University of Southern California; visiting professor University of Colorado; chairman, P.E. Department and chief of party, U.S. AID program, Evelyn Hone College of Further Education, Lusaka, Zambia; physical education specialist, Uganda, Somalia, and Ethiopia, U.S. State Department.

MOUNTS, BILLY W. (1956) Director, Health Services
M.D., Georgetown University, Washington, D.C., 1950.

Experience: Internship, Fitzsimons General Hospital, Denver; residency, San Luis Obispo General Hospital; four years private practice, Pismo Beach.

MOY, CARL F. (1968) Dairy Science
B.S., University of Wisconsin, 1967.

Experience: U.S. Air Force; research assistant, University of Wisconsin; laboratory supervisor, The Borden Company; cultured products manager, Pensupreme Dairies, Inc.; quality control director, The Borden Company; member, Wisconsin Dairy Technology Society.

MULDER, GEORGE (1968) Director, Counseling & Testing
B.A., Long Beach State College, 1956; M.A., 1957; Ph.D., University of Southern California, 1971.

Experience: Associate Dean (Counseling) and counselor, California State Polytechnic College, Kellogg-Voorhis; teacher, Excelsior Union High School District; counselor-instructor, Cerritos College; electronic technician, U.S. Army Ordnance; drafting, tool design, and technical illustration, Goodyear Tire and Rubber and Shoffer Tool Company.

Faculty and Staff

MURPHY, HASPARD R., MAJ. (1970).....Military Science
B.S., Tuskegee Institute, 1962. Graduate: The Infantry School; Army Aviation School; Airborne School.

Experience: Company commander, 1st Cavalry Division, Korea; Air Cavalry Troop Commander, 82nd Airborne Division; Operations and Training Officer, 478th Aviation Company, 1st Cavalry Division, Vietnam; Operations Officer, Aviation Section, United States Strike Command, Tampa, Florida.

NEEL, PAUL R. (1962).....Director, School of Architecture
and Environmental Design
B.S., California State Polytechnic College, 1958; B. Arch., University of Southern California, 1962. M. Arch., University of Sheffield, 1969.

Experience: Designer-draftsman, W. D. Concolino, Monterey; designer, Jones & Emmons, Los Angeles; private practice California; visiting lecturer, University of Sheffield, England. Registered architect, California.

NEELANDS, JAMES G. (1957)Equipment Technician, Physical and
Biological Sciences
B.S., California State Polytechnic College, 1956; additional graduate study, University of Washington.

Experience: Teaching assistant and research assistant, University of Washington; naval aviator and officer, U.S. Marine Corps.

NELSON, LINDEN L. (1970).....Psychology
B.A., University of Northern Iowa, 1966; Ph.D., University of California, Los Angeles, 1970.

Experience: Counselor and athletics instructor, Braemer Boys' Camp, Park Rapids, Minnesota; Boys' club leader, YMCA, Cedar Falls, Iowa; teaching assistant, research assistant, Department of Psychology, University of California.

NELSON, RICHARD F. (1960).....Head, Biological Sciences Department
B.S., Brigham Young University, 1955; M.S., 1957; Ph.D., State University of Iowa, 1960.

Experience: Teaching assistant, Brigham Young University, State University of Iowa; research associate in radiation biology, State University of Iowa.

NEWTON, CHARLES H. (1966)Counselor
B.A., San Diego State College, 1950.

Experience: Loftsmen, design draftsman, and tool designer, Ryan Aeronautical, Convair and Multiplex, Inc.; secondary school teacher, counselor and curriculum writer, San Diego City Schools; assistant school psychologist, Mesa, Arizona Public Schools; U.S. Air Force.

NICHOLSON, LOREN L. (1956).....Journalism
A.B., San Jose State College, 1946; M.B.A., Stanford University, 1947; additional graduate study, Stanford University.

Experience: Advertising sales representative, Watsonville Register-Pajaronian; advertising sales correspondent, Sunset Magazine; advertising director, Redding Record-Searchlight.

NICKELL, DELL O. (1965).....Architecture
B.A., San Jose State College, 1950.

Experience: Assistant engineer, San Jose Water Works; associate bridge engineer, California State Bridge Department; partner, Gillette-Harris & Associate, Auburn; assistant road commissioner-surveyor, San Luis Obispo County. Registered civil engineer, California.

Faculty and Staff

NIELSEN, KEITH E. (1959) Speech
B.A., Alma College, 1953; M.A., Stanford University, 1959; M.A.Ed., California State Polytechnic College, San Luis Obispo, 1966; Ph.D., Michigan State University, 1970.

Experience: Graduate assistant, Michigan State University; high school teacher, State of Michigan; professional actor and play director; ranger-naturalist, National Park Service and State of California; neuro-psychiatric nursing assistant, U.S. Veterans Administration Mental Hospital and St. Lawrence Hospital; farmer; power plant engineer; welder.

NILES, PHILIP W. B. (1967) Environmental Engineering
B.S., University of California, 1957; M.S., 1958; additional graduate study, University of California, Los Angeles.

Experience: Consultant, Rand Corporation; teaching assistant and post-graduate research engineer, University of California, Los Angeles; senior research engineer, Rocketdyne.

NIU, SHIEN HWEI (1969) Library
B.A., National Taiwan University, 1951; M.A., Bucknell University, 1957; additional graduate studies, University of Wisconsin; M.A., Library Science, Indiana University, 1967.

Experience: Assistant catalog librarian, Drake University Library.

NOBLE, GLENN A. (1947) Biological Sciences
A.B., University of California, 1931; M.A., 1933; Ph.D., Stanford University, 1940.

Experience: Assistant in zoology, College of the Pacific; instructor, San Francisco City College; consultant in biology, American Military Government in Korea; professor of parasitology, Seoul National University, Korea; Fulbright professor of parasitology, Philippines and Taiwan.

NOLAN, THOMAS F. (1949) Social Sciences
B.S., University of Wisconsin, 1935; M.A., University of Southern California, 1940; additional graduate study at the University of Zurich, Switzerland.

Experience: Instructor senior high school, Stockbridge, Wisconsin; instructor senior high school, Kaukauna, Wisconsin; instructor, American School, Quito, Ecuador; Economic Analyst, Department of State, Washington, D.C., Montevideo, Uruguay; Officer, U.S. Naval Reserve; Vice-Consul, Department of State, Washington, D.C. at Valparaiso, Chile.

NORDQUIST, RAYMOND E. (1964) Architecture
B.S. Arch., Montana State College, 1950; additional graduate study, Montana State University, California State Polytechnic College.

Experience: Private architectural practice; principal partner, Nordquist & Sundell, Architects; chief designer, Cushing & Terrell; designer and draftsman for architects and building contractors in Montana and Washington. U.S. Army Air Corps. Registered architect, Montana and Wyoming.

NORRIS, ROBERT E. (1970) Social Sciences
B.S., Arizona State University, 1962; M.A., 1965; Ph.D., University of Iowa, 1970.

Experience: Teaching and research assistant, Arizona State and University of Iowa; instructor, North Texas State University and University of Iowa; assistant professor, Arizona State University; procedure writer and analyst, AiResearch Mfg. Co., Phoenix, Lockheed Missiles and Space Co., Sunnyvale, and Talley Ind., Inc., Mesa, Arizona; U.S. Air Force.

NOSHY, AMEEN I. (1969) Architecture
B. Arch., Cairo University, 1963; M.S. Arch., Illinois Institute of Technology, Chicago, 1969.

Experience: Draftsman in architectural firms in Cairo and West Berlin; designer and field supervisor in Development and Popular Housing Corp., Cairo; instructor at Al-Azhar University, Cairo; designer, Cairo, P. L. Nervi, Rome and C. F. Murphy, Assoc., Chicago.

Faculty and Staff

- O'CONNOR, EUGENE L. (1964)**.....Business Administration
 B.S., St. Louis University, 1957; M.S., 1963.
 Experience: Assistant manager, Knights of Columbus, Inc.; sales representative, Burroughs Corporation; executive director, Madison County Association for the Crippled, Inc.; instructor in business, Belleville Junior College.
- O'DANIELS, HOWARD R. (1933)**.....Business Administration
 Bachelor of Commercial Science, University of Santa Clara, 1931; additional graduate study, University of Southern California.
 Experience: Coach, California State Polytechnic College; officer, U.S. Navy.
- OFFERMANN, GENE P. (1970)**.....Crop Science
 B.S., Southern Illinois University, 1964; M.S., 1965; Ph.D., University of California, Davis, 1970.
 Experience: Research assistant, Southern Illinois University and University of California, Davis; general farming.
- O'LEARY, MICHAEL J. (1951)**.....Social Sciences
 A.B., San Francisco State College, 1950; M.A., Stanford University, 1951; additional graduate study, Stanford University, University of Oregon.
 Experience: Property accountant, U.S. Marine Corps Supply Depot; instructor and examiner-specialist, Air Force Radar Technical School; instructor, U.S. Armed Forces Institute.
- OLIVER, WILLIAM A. (1968)**.....Welding and Metallurgical Engineering
 B.S., California State Polytechnic College, 1966.
 Experience: Printer and draftsman, H. M. Gousha Co., San Jose; welder, On Manufacturing Company, San Jose; welding technician, Mare Island Shipyard, Vallejo; lecturer, California State Polytechnic College; welding engineer, Westinghouse Electric, Sunnyvale.
- OLSEN, BARTON C. (1968)**.....History
 B.A., University of Utah, 1955; M.A., 1966; Ph.D., 1968.
 Experience: Teacher, South High School, Salt Lake City; Washington Union and Sanger Union High School, California; principal, Cardston School District, Cardston, Alberta, Canada.
- OLSTEN, C. JAMES (1968)**.....Architecture
 B.S., California State Polytechnic College, 1964; B. Arch., 1965; graduate study, The Pennsylvania State University.
 Experience: Civil engineering assistant, E. A. Jennings & Associates, Architects; U.S. Army.
- ORTH, MICHAEL P. (1967, 1970)**.....English
 B.A., University of California, 1959; M.A., San Francisco State College, 1963; additional graduate study, University of New Mexico, Claremont Graduate School.
 Experience: Instructor, Chico State College, University of New Mexico.
- OSTEYEE, LEON F. (1957)**.....Mechanical Engineering
 B.M.E., Rensselaer Polytechnic Institute, 1945; M.M.E., 1957, additional graduate study, The Pennsylvania State University, 1969.
 Experience: Instructor, Rensselaer Polytechnic Institute; designer, General Electric Company; American Locomotive Co.; ship superintendent, U.S. Naval Shipyard, Bremerton, Washington; registered professional engineer, California and New York.

Faculty and Staff

OVERMEYER, PHILIP H. (1958).....Business Administration
B.S., University of Oregon, 1931; M.S., 1936; Ph.D., University of Minnesota, 1939.

Experience: High school instructor; teaching fellow, University of Minnesota; assistant professor, University of Alabama; federal administrator, WCLC of the National War Labor Board; lecturer, De Paul University; professor, Lewis and Clark College; private arbitrator, labor disputes; public member, Region XIII, Wage Stabilization Board; regional director, Office of the Salary Stabilization; co-ordinator of Instruction, Golden Gate College San Francisco; Professional Lecturer.

OWEN, EVAN R. (1969).....Head, Electronic Engineering Department
B.S., Northwestern University, 1945; M.S., University of Pennsylvania, 1949; Ph.D., Northwestern University, 1953.

Experience: Manager of Advanced Engineering, General Electric Company; instructor, Northwestern University. Registered professional engineer, California, Florida.

OWEN, MARY H. (1970).....Graduate Nurse
R.N., Orange Memorial Hospital School of Nursing, Orlando, Florida, 1970.

Experience: Staff nurse, Orange Memorial Hospital, Orlando, Florida (1970).

OZAWA, KENNETH S. (1963).....Physics
B.S., John Carroll University, 1959; M.S., 1960; additional graduate study, Texas A & M, University of California.

Experience: Graduate assistant and instructor, John Carroll University.

PAGE, PERRYMAN L. (1963).....Library
B.A., University of Mississippi; M.S.L.S., Louisiana State University, 1963.

Experience: U.S. Air Force.

PATTERSON, ROY L. (1968).....Medical Officer
B.S., University of Illinois; B.M., M.D., 1938.

Experience: Internship, Englewood Hospital, Chicago; private practice, Canton, Illinois and Monrovia, California.

PATTERSON, SHANNON R. (1970).....Library
B.A., University of Colorado, 1965; M.L.S., Rutgers University, 1966.

Experience: Reference Librarian, University of British Columbia.

PAUL, GORDON J. (1969).....Business Administration
B.S., Montana State College, 1957; M.B.A., University of New Mexico, 1966.

Experience: Controller and treasurer, The Dikewood Corporation, Albuquerque; manager, financial accounting, ACF Industries, Inc., Albuquerque.

PAUTZ, ROLAND K. (1959).....Poultry Industry
B.S., Oregon State College, 1957; M.S., Oregon State University, 1968.

Experience: Research assistant, Oregon State College, 1957-59.

PEDERSON, WILLARD M. (1961).....Head, English Department
A.B., Colorado Western State College, 1937; M.A., Colorado State College, 1938; additional graduate study, Colorado State College, Western Reserve University, Colorado State University.

Experience: English teacher and football coach, Shaker Heights High School, Cleveland, Ohio; English instructor, football coach and athletic director, Mount Union College; associate professor and director of athletics, Marshall College; associate professor and athletic coach, Colorado Western State; professional athletics; officer, Navy Underwater Demolition.

PELLATON, EVELYN I. (1966).....Women's Physical Education
B.A., San Francisco State College, 1950; M.A., 1953.

Experience: Director, Oakland Recreation Department; official and gym supervisor, San Francisco Recreation Department; summer camp counselor; WAVE athletic officer, Special Services, U.S. Navy; instructor, Marin Catholic High School, Portola Junior High School; dean-counselor, Portola Junior High School, Downey Junior High School.

Faculty and Staff

- PENDSE, PRATAPSINHA C. (1966)**.....Biological Sciences
B.S., Bombay University, 1947; M.S., Poona University, 1951; M.S., Utah State University, 1959; Ph.D., 1965; additional graduate study, Stanford University, Yale University, McGill University.
Experience: Lecturer, Bombay and Poona Universities; teaching and research assistant, Utah State University; assistant professor, Colgate University.
- PERELLO, DOMINIC B. (1954)**.....Economics
A.B., University of California, Santa Barbara College, 1951; M.S., University of Wisconsin, 1952; additional graduate study, University of California at Los Angeles.
Experience: Officer, U.S. Air Force; partner, Perello and Sons; teaching assistant, University of California at Los Angeles.
- PETERS, JAMES M. (1958-60) (1963)**.....Chemistry
A.B., University of California, 1953; Ph.D., 1957.
Experience: Biochemist, University of California; instructor, California State Polytechnic College; biochemist, Baltimore City Hospitals; assistant professor, University of Maryland.
- PETERS, RALPH A. (1969)**.....Physics
B.S., Georgetown University, 1949; M.S., Pennsylvania State University, 1951; Ph.D., Fordham University, 1967.
Experience: Assistant professor, Lewis College; instructor and graduate assistant, Michigan State University; assistant professor, Fordham University; associate professor, University of the Pacific.
- PETERSON, JAMES J. (1964)**.....English
B.A., Bradley University, 1952; M.A., University of Pennsylvania, 1956; additional graduate study, Temple University, University of Pennsylvania.
Experience: Assistant instructor, University of Pennsylvania; substitute teacher, Philadelphia Public Schools; high school instructor, Bryn Mawr, Pennsylvania; instructor, Susquehanna University, New York State University.
- PHAKLIDES, WILLIAM J. (1963)**.....Engineering Technology
B.S., California State Polytechnic College, 1956; graduate study, Montana State University.
Experience: U.S. Army and U.S. Navy; design engineer, Baker-Newman Co., Inc., and Barium Products, Ltd., Modesto; Conditioned Air, Fresno. Registered professional engineer, California.
- PHILLIPS, PETER K. (1968)**.....Facilities Planner
B.S., California State Polytechnic College, 1959.
Experience: Designer-draftsman, John R. Ross and Associates, Inc., San Luis Obispo and Arendt/Mosher/Grant, Architects, Santa Barbara; private practice. Registered architect, California.
- PHILLIPS, WILLIAM R. (1957)**.....Director, School of Architecture and Environmental Design
B.Arch., University of Southern California, 1952.
Experience: Designer, W. H. Harrison, Architect; Sponseller & Sons; U.S. Engineer Department; engineer, North American Aviation, Inc.; fallout shelter analysis, Office of Civil Defense, Dept. of Army. Registered architect, California.
- PIERCE, DOUGLAS R. (1969)**.....Director, International Education
B.S., University of Illinois, 1955; M.Ed., University of Illinois, 1959; D.Ed., University of Florida, 1963; additional graduate study, University of California, Berkeley.
Experience: Elementary and middle school teacher, Illinois; assistant professor, Cornell University and University of Minnesota; visiting professor, University of Rochester and The Johns Hopkins University.
- PIMENTEL, RICHARD A. (1952)**.....Biological Sciences
A.B., San Jose State College, 1947; M.S., Oregon State College, 1950; Ph.D., 1952.
Experience: Officer, U.S. Army; teaching assistant, Oregon State College; ranger-naturalist, Crater Lake National Park; associate professor, University of California Extension Nature Study Institute at Santa Barbara; lecturer, National Science Foundation Summer Science Program.

Faculty and Staff

- PINARD, LEO W., II** (1970)..... Social Sciences
 B.A., University of Santa Clara, 1962; M.A., University of Notre Dame, 1963.
 Experience: Teaching assistant, University of Notre Dame; lecturer, Immaculate Heart College; fertility research, USAID, Philippines.
- PIPER, CURTIS DEAN** (1964)..... Head, Soil Science Department
 B.A., W. T. Bryan University, 1953; M.S., Michigan State University, 1959; Ph.D., 1967.
 Experience: Farm operator; food service director, Kings College; instructor in research and teaching, Michigan State University.
- PIPPIN, LOUIS D.** (1970)..... Education
 B.S., West Texas State College, 1952; M.Ed., 1956; Ed.D., North Texas State University, 1970.
 Experience: Teacher, Baird, Happy and Amarillo, Texas; counselor, Amarillo High School; visiting professor, North Texas State University; U.S. Army.
- POLK, BENJAMIN K.** (1966)..... Architecture
 Diploma, School of Planning and Research in Regional Development, England, 1952.
 Experience: Private practice in architecture and planning, 1948-1965. Registered architect, California and New York.
- POWER, CHERYL** (1969)..... Home Economics
 B.S., Kansas State University, 1965; M.S., Iowa State University, 1967.
 Experience: Instructor, Texas Technological College; high school teacher, Arkansas City, Kansas.
- PRATER, EUGENE G.** (1967)..... English
 B.A., Phillips University, 1952; B.D., Vanderbilt University, 1954; M.A., 1955; S.T.M., Harvard University, 1956; additional graduate study, Stockholm University.
 Experience: Minister, First Congregational Church, Suddy, Tennessee; instructor, Curry College; assistant minister, Montclair, New Jersey; writer, Department of Interior; researcher, Library of Congress; assistant professor, Ball State University, Washington State College, California State College at Long Beach; instructor, University of San Francisco.
- PRICE, CLIFFORD J.** (1956)..... Aeronautical Engineering
 B.S., University College, South Wales, 1932.
 Experience: Lecturer, Municipal College, England; South African Air Force School of Technical Training; Pretoria Technical College, South Africa. Chief technical officer, South African Air Force School; Major, South African Air Force; chief inspector of aircraft accidents and aircraft materials; head of Aircraft Accident Investigation Branch, Division of Civil Aviation, Union of South Africa. Instructor, Northrop Aeronautical Institute.
- PRICE, D. JOHN** (1957)..... Mechanical Engineering
 National Certificate in M.E., Dudley and Staffordshire Technical College, 1950; B.S., California State Polytechnic College, 1954.
 Experience: Engineer, British Electricity Authority; assistant planning engineer, British Columbia Telephone Co.; technical assistant, Vickers Armstrong Ltd.; officer, RCAF.
- QUINLAN, CHARLES W.** (1966)..... Architecture
 B.Arch., Cornell University, 1959.
 Experience: Private practice, urban planning and architecture; instructor, University of New Mexico; registered architect, California; NCARB certified; associate, A.I.P., A.I.A.
- QUINN, PETER L.** (1967)..... Mathematics
 B.S., University of Wales, Cardiff, 1925, B.S., (hons) 1926; Education Diploma, University Reading, England, 1931; Ph.D., University London, England, 1958; Ph.D., University Cork, Ireland, 1967.
 Experience: Lecturer, Beaufoy Technical College, London; lecturer, Hackney Technical College, Stretford Technical College, England; instructor, Tottenham Technical College, London; head of science department, Walworth High School, London, England; lecturer, University Cork, Ireland; assistant professor, College of Education, Monmouth, Oregon.

Faculty and Staff

RABE, PETER (1967) **Psychology**
B.A., Ohio State University, 1943; M.A., Western Reserve University, 1948; Ph.D., 1949.

Experience: Self-employed psychological counseling, therapy, writer; research fellow, Jackson Laboratory, Bar Harbor, Maine; lecturer, Western Reserve University.

RAMSEY, O. C. (1970) **Mathematics**
B.S., University of Washington, 1961; M.A., Washington State University, 1965; Ph.D., 1967.

Experience: Actuarial trainee, Pacific Mutual Life Insurance Co.; programmer, System Development Corporation, Santa Monica, California; research assistant, Washington State University; assistant professor, University of Iowa.

RAPP, JOHN B. (1959) **Electronic Engineering**
B.S., University of California, 1940; M.S., San Jose State College, 1967.

Experience: Engineer, General Electric Company, Collins Radio Company, United Fruit Company; instructor, Princeton University; registered professional engineer, California.

RATCLIFFE, RONALD V. (1963) **Music**
B.A., University of Washington, 1956; M.M., University of Southern California, 1958.

Experience: Piano teacher; assistant professor, The College of the Ozarks; music director, Music-Go-Round Theater; buyer, The Boeing Company.

RATHBUN, LARRY P. (1970) **Agricultural Education**
B.S., California State Polytechnic College, San Luis Obispo, 1964; M.A., 1967.

Experience: Director of agriculture, Rio Vista High School; director of agriculture, coordinator of vocational education, coordinator of Manpower Development Act, Los Banos High School; evening instructor, Modesto Junior College and Merced College.

REA, JOHN B. (1969) **Art**
B.F.A., University of Illinois, 1963; M.F.A., Rochester Institute of Technology, School for American Craftsman, 1965.

Experience: Self-employed silversmith; instructor, Colorado State University; graduate instructor, Rochester Institute of Technology.

REAGAN, EVELYN D. (1946) (1954) **Library**
B.S., College of St. Catherine, 1943.

Experience: Librarian, College of the Holy Cross, Worcester, Massachusetts; librarian, Charity Hospital School of Nursing, New Orleans; cataloger, California State Polytechnic College.

REECE, OSCAR E. (1956) **Crops Science**
B.S., Kansas State College, 1931; M.S., University of Minnesota, 1945; Ph.D., 1949.

Experience: Grade school principal, Hopewell and Smith Center, Kansas; agricultural instructor, Norcat, Hope, and Silver Lake, Kansas; county agricultural agent, Rice County, Kansas; research fellow, University of Minnesota; assistant agronomist USDA, Division of Sugar Plants, Field Office, St. Paul, Minnesota; associate professor of agriculture, Iowa State Teachers College.

REIF, GARY D. (1967) **Dairy Science**
B.S., Kansas State University, 1962; M.S., University of Nebraska, 1964.

Experience: Research assistant, University of Nebraska; research and teaching assistantship, director of dairy and food products analysis laboratory, Iowa State University.

REILLY, DONALD F. (1969) **Graphic Communications**
B.S., La Salle College, 1954; B.S., Carnegie Institute of Technology, 1957; M.S., South Dakota State College, 1962.

Experience: Technical sales and service, 3M Company; assistant professor and department chairman, West Virginia Institute of Technology; assistant foreman, Continental Can Company; compositor and pressman, Clark-Guilfoyle Company; graphic arts consultant, R. A. Pettengill Co.

Faculty and Staff

- REMUND, CLIVE O. (1946)**.....Agricultural Engineering
 B.S., Utah State Agricultural College, 1931.
 Experience: Teacher, Utah high schools; agricultural instructor and critic teacher, California high schools.
- REYNOLDS, ROBERT G. (1963)**.....Audio-Visual/Architecture
 B.P.A., Art Center School, Los Angeles, 1962; graduate study, California State Polytechnic College.
 Experience: Artist, Creative Arts Studio, San Luis Obispo; free-lance illustrator-painter, Los Angeles and San Luis Obispo.
- REYNOLDS, R. WALLACE (1953)**.....Engineering Technology
 B.S., California (Pa.) State Teachers College, 1940; M.S., Purdue University, 1946; additional graduate study, University of Pittsburgh, University of Southern California.
 Experience: Assistant educational adviser, Civilian Conservation Corps; weight engineer, Douglas Aircraft Company; ordnance engineer, Naval Ordnance Laboratory; instructor, Purdue University; head, engineering drawing, Washington and Jefferson College; assistant professor, University of Santa Clara; instructor, West Coast University, University of California at Los Angeles, part-time; engineering designer, Hughes Aircraft Company; consulting work in tool design and machine design.
- REYNOLDS, WINIFRED (1968)**.....Child Development
 B.A., Ohio State University, 1931; M.S., 1934.
 Experience: Graduate assistant, Ohio State University; head teacher, Neighborhood Settlement House, Detroit; instructor in child development and head nursery school teacher, University of Tennessee; assistant professor and director of nursery school, San Jose State College, Texas Woman's University; associate professor of child development and director of nursery school, Colorado State University.
- RHOADS, HOWARD (1956)**.....Crops Science
 B.S., Montana State College, 1951; M.S., 1952.
 Experience: Fieldman, Great Western Sugar Co., Billings, Montana; instructor and assistant, Montana State College.
- RICE, JAMES E. (1963)**.....Graphic Communications
 B.S., Kansas State College, 1956; M.A., Fresno State College, 1966.
 Experience: Assistant circulation manager, Coffeyville, Kansas, Daily Journal and Pittsburg, Kansas, Headlight-Sun; personnel specialist, U.S. Army; industrial arts instructor and director of student affairs, Delano High School.
- RICE, WALTER E. (1964)**.....Economics
 B.A., San Francisco State College, 1960; M.A., 1963; additional graduate study, Claremont Graduate School.
 Experience: Assistant floor manager, Roos/Atkins; student teacher, College of San Mateo; tutor, San Francisco; instructor, California State Polytechnic College, Kellogg-Voorhis.
- RICH, GLENN W. (1953)**.....Agricultural Engineering
 B.S., California State Polytechnic College, 1953; M.A., 1961.
 Experience: Journeyman carpenter, U.S. Coast Guard; instructor, California State Polytechnic College.
- RICHARDS, THOMAS L. (1969)**.....Biological Sciences
 B.S., California State College, Long Beach, 1964; M.A., 1966; Ph.D., University of Maine, 1969.
 Experience: Technical and research assistant, California State College, Long Beach; research assistant, NDEA fellow, Ira C. Darling Marine Laboratory, Walpole, Maine.

Faculty and Staff

- RICHARDSON, JOY O. (1948)** Engineering Technology
 B.S., University of Nebraska, 1940; M. of Engr., Yale University, 1942.
 Experience: Instructor, Yale University, New Haven Junior College, New Haven, Connecticut; instructor, Orland High School, Orland, California; machine designer, Rockbestos Products Corporation; engineer, Marlin Firearms Company; Bristol Aeronautical Corporation, New Haven, Connecticut; engineer, Johns Manville Corporation, Tilton, New Hampshire; vice president and treasurer, Richardson Industries, Incorporated, East Haven, Connecticut. Registered professional engineer, California.
- RICKARD, HERMAN E. (1959-68) (1969)** Dairy Science
 B.S., Ohio State University, 1950; M.S., 1954; Ph.D., 1958.
 Experience: Assistant Herdsman, research assistant, in charge of federal dairy breeding program, Ohio State University. Dairy Department, California State Polytechnic College, San Luis Obispo; Extension Dairy Specialist, Ohio State University.
- RIDER, ROL W., JR. (1960)** Business Administration
 B.A., University of California, 1941; M.A., 1967.
 Experience: U.S. Naval Aviation (Reserve); Flight operations and airport management, Pan American Airways; National Sales Manager, Royal Rinse, Inc.; Divisional Product-Advertising Manager, Carnation Co., Inc.; Account Executive, N. W. Ayer & Son, Inc.; Account Supervisor, Young & Rubicam, Inc.; Management and Marketing Consultant.
- RIEDLSPERGER, MAX E. (1969)** History
 A.B., Wabash College, 1959; M.A., University of Michigan, 1961; Ph.D., University of Colorado, 1969.
 Experience: Teacher, Eastern High School, Bay de Noc Community College; teaching associate, University of Colorado; instructor, Temple Buell College; Fulbright Scholar, University of Salzburg.
- RIHAL, SATWANT S. (1969)** Architecture
 B.S., University of Delhi, India, 1961; M.S., University of Minnesota, 1964; Ph.D., University of New Mexico, 1969.
 Experience: Civil engineer, Central Water and Power Commission, New Delhi; structural engineer, T. T. Burnett Engineering Inc., Albuquerque, New Mexico; instructor, Univ. of New Mexico; consultant, Hydro-Conduit Corporation, Albuquerque, New Mexico.
- RITSCHARD, RONALD L. (1965)** Biological Sciences
 B.S., California State Polytechnic College, 1961; M.S., Oregon State University, 1964; Ph.D., 1966.
 Experience: Teaching and research assistant, Oregon State University; National Science Foundation Fellow, University of Massachusetts; Atomic Energy Commission Fellow, University of Kansas.
- RITTENHOUSE, EUGENE A. (1949)** Director, Placement and Financial Aids
 B.S., University of California, Los Angeles, 1947; M.B.A., University of California, Berkeley, 1948; additional graduate study, University of California, Berkeley.
 Experience: Bookkeeper, J. J. Elmore Company, Brawley; broker's clerk, Dean Witter & Co., Los Angeles; purchasing, War Department, USAAF, Trinidad, B.W.I.; U.S. Navy; instructor, social sciences; administrative assistant for personnel, office of the president, California State Polytechnic College.
- ROACH, DAVID M. (1966)** Physics
 B.S., South Dakota School of Mines and Technology, 1961; M.S., 1963.
 Experience: Graduate assistant, instructor, South Dakota School of Mines and Technology; instructor, Wisconsin State University, Northrop Institute of Technology; engineer, Leach Corporation.
- ROBERTS, ALICE E. (1963)** Education
 B.S., Milwaukee State Teachers College, 1940; M.S., University of Wisconsin, 1962.
 Experience: Elementary school teacher, West Bend, Wisconsin; participant in Wisconsin Education Improvement Program; leader in team teaching and intern program.

Faculty and Staff

- RODIN, ROBERT J. (1953)** Biological Sciences
 A.B., University of California, 1943; Ph.D., 1951.
 Experience: Assistant botanist, University of California Herbarium; ranger naturalist, Yosemite National Park; administrative clerk, U.S. Marine Corps; expedition botanist, University of California African Expedition; teaching assistant, University of California; lecturer for extension division, University of California; professor of biology, Forman Christian College, Lahore, Pakistan; visiting assistant professor, University of California, Santa Barbara; lecturer, National Science Foundation Summer Science Program; visiting assistant professor and National Science Foundation fellow, Cornell University, New York.
- ROEST, ARYAN I. (1955)** Biological Sciences
 B.S., University of Virginia, 1945; B.S., Oregon State College, 1948; M.S., 1949; Ph.D., 1954.
 Experience: Officer, U.S. Navy; teaching and research assistant, Oregon State College; assistant professor, Central Oregon College; forester, Oregon State Board of Forestry; lecturer, Extension Division, University of California; visiting assistant professor, University of California, Santa Barbara; lecturer, National Science Foundation Summer Science Program.
- ROGALLA, JOHN A. (1959)** Agricultural Management
 B.S., California State Polytechnic College, 1956; M.S., Cornell University, 1958; Ph.D., Cornell University, 1968.
 Experience: Teaching and research assistant, Department of Agricultural Economics, Cornell University; farm management consultant; material control analyst, Ryan Aeronautical Company; U.S. Air Force.
- ROGERS, JOHN M. (1970)** Computer Science & Statistics
 B.S., Marion College, 1962; M.S., Kansas State University, 1966; additional graduate study, Virginia Polytechnic Institute.
 Experience: Teacher, Jefferson Township High School; teacher, Army Education Center, Fort Riley, Kansas; graduate teaching assistant, Kansas State University; lecturer, California State Polytechnic College, San Luis Obispo.
- ROGERS, LEO E. (1954)** Engineering Technology
 B.S., California State Polytechnic College, 1950.
 Experience: Instructor, San Luis Obispo High School; engineering aid, Division of Highways, San Luis Obispo.
- ROHNER, J. WELDON (1964)** Business Administration
 B.A., Arizona State College, 1934; graduate study, University of Utah, Arizona State College.
 Experience: Teaching fellow, University of Utah; accountant, Rogers and Bailey; training supervisor, Standard Oil of New Jersey; special agent, Federal Bureau of Investigation.
- ROLLINGS, DAVID R. (1968)** English
 A.B., University of Louisville, 1948; M.A., University of Michigan, 1949.
 Experience: Assistant professor, Wisconsin State University, University of Puerto Rico, East Kentucky State College, Wisconsin State College.
- ROMNEY, JOSEPH B. (1969)** History
 B.S., University of Utah; J.D., 1963; M.A., 1967; Ph.D., 1969.
 Experience: Musician, Utah Symphony Orchestra; research clerk, Utah Supreme Court; assistant, Utah State Attorney General; lawyer, Romney & Boyer; teaching assistant, University of Utah.
- ROSEN, ARTHUR Z. (1953)** Physics
 A.B., University of California, 1941; Ph.D., 1952.
 Experience: Physicist, University of California Radiation Laboratory; U.S. Navy; teaching and research assistant, University of California; lecturer, University of California, Santa Barbara College.

Faculty and Staff

ROSENBERG, ROBERT L. (1970).....History
B.A., Stanford University, 1944; M.A., University of Washington, 1964; additional graduate study, University of Washington.

Experience: Lecturer, supervisor of student teaching, University of Washington; teacher, Bellevue Community College, Washington, Highline Senior High School, Washington; instructor, U.S.A.R. and Provost Marshal, 42d Infantry Division, Salzburg, Austria.

ROSKE, MILDRED E. (1967).....Home Economics
B.A., University of California, 1955; M.A., 1958.

Experience: Interior designer, Sherman Oaks; teaching assistant, instructor, University of California; teacher, adult education, Los Angeles City Schools; instructor, Rochester Institute of Technology; teacher, Oxnard Evening School.

RUDLAND, ROBERT SEAY (1970).....Mechanical Engineering
B.S., Georgia Institute of Technology, Atlanta, 1963; M.S., 1966; Ph.D., 1969.

Experience: Captain (research scientist), Army Aeronautical Research Laboratory, NASA Ames, Moffett Field, California; senior thermodynamics engineer, Lockheed Georgia Co.; research assistant, teaching assistant, Georgia Institute of Technology.

RUSSELL, CHARLES R. (1968).....Associate Dean, School of Engineering
and Technology

B.S., Washington State College, 1936; M.S., California Institute of Technology, 1946; Ph.D., University of Wisconsin, 1941.

Experience: Section head, General Motors Corp., U.S. Atomic Energy Commission; program administrator, Navy Bureau of Ordnance; engineer, Procter and Gamble, Dow Chemical. Registered professional engineer, California, Michigan, Virginia, and District of Columbia.

RUSSELL, JOHN G. (1968).....Music
A.B., Fresno State College, 1959; M.A., Chico State College, 1968.

Experience: Instructor, Fresno State College; teacher, Laton Union High School, Chico Senior High School; assistant professor, Chico State College.

SAAM, PATRICIA (1966).....Home Economics
B.S., College of St. Catherine, St. Paul, Minnesota, 1950; graduate study, University of Minnesota, California State Polytechnic College.

Experience: Research-pediatrics dietitian, University of Minnesota; head dietitian, Paso Robles War Memorial Hospital, Sierra Vista Hospital; dietitian, dining hall, and part-time lecturer, California State Polytechnic College.

SABTO, JACOB (1968).....Electrical Engineering
B.E.E., Cairo University, 1948; Ingenieur Radio-ESE, Ecole Supérieure D'Electricite, Paris, 1951; E.E., Columbia University, 1959; additional graduate study, New York University.

Experience: Lecturer, City College of New York and Institute of Technology, Hoboken, New Jersey; Adjunct Professor, Newark College of Engineering; development engineer, I.T.T., Nutley, New Jersey; technical staff, Bell Telephone Laboratories, Holmdel, New Jersey.

SALO, GLENN W. (1955).....Agricultural Engineering
B.S., Montana State College, 1950; M.S., University of Idaho, 1955.

Experience: Shops officer, U.S. Air Force; instructor and assistant agricultural engineer, University of Idaho; Research Fellow, University of Idaho.

SANCHEZ, DAVID J. (1970).....Head, Ethnic Studies Department
B.B.A., University of Texas at El Paso, 1950; graduate study, University of California, Santa Barbara.

Experience: Junior high teacher, Tornillo, Texas; insurance agent; teacher, Lucia Mar Unified School District, Pismo Beach; part-time lecturer, California State Polytechnic College, San Luis Obispo.

Faculty and Staff

SANDERSON, JAMES D. (1967) Men's Physical Education
 A.B., Fresno State College, 1962; M.S., California State Polytechnic College, 1969.
 Experience: Teacher and coach, Tulare Western High School, Tulare, and Sierra High School, Tollhouse.

SANDLIN, DORAL R. (1969) Aeronautical Engineering
 B.S., U.S. Naval Academy, 1954; M.S., Air Force Institute of Technology; additional graduate study, University of Arizona.
 Experience: Flight test maintenance officer and pilot, U.S. Air Force; missile branch chief, Holloman Air Force Base, New Mexico; chief, aeromechanics branch, Flight Dynamics Laboratory, Wright-Patterson Air Force Base, Ohio.

SANKOFF, LEO (1946) Poultry Industry
 B.S., California State Polytechnic College, 1942; M.A., 1956.
 Experience: Agricultural instructor, Fillmore High School.

SAVEKER, DAVID R. (1968) Architecture
 A.B., Stanford University, 1941; Certificate Naval Architecture, U.S. Naval Academy Post Graduate School, 1942; M.S., Naval Architecture & Marine Engineering, Massachusetts Institute of Technology, 1946; Certificate Naval Warfare, U.S. Naval War College, 1959; additional graduate study, California State Polytechnic College, 1968-69.
 Experience: Engineering duty officer, officer in charge of Underwater Explosives Research Division, Norfolk Naval Shipyard, nuclear test program officer, new construction and ship repair, plant staff (maintenance), senior management and command duties, U.S. Navy.

SCALES, HARRY H. (1958) Education
 B.A., Arizona State College, 1934; M.A., Stanford University, 1939; Ed.D., 1950.
 Experience: Teacher and counselor, Santa Barbara Junior College; associate professor and consultant to industry and schools, Michigan State University; aerial navigation training, U.S. Navy; teacher and guidance director, Redlands High School; director of research, Arizona State Department of Education; teacher, Superior and Safford, Arizona, public schools.

SCHEFFER, PAUL E. (1964) Industrial Engineering
 B.M.E., University of Minnesota, 1947; M.S., University of Southern California, 1959.
 Experience: Chief industrial engineer, Crane Company; senior industrial engineer, U.S. Rubber Company; engineer, Appraisal Service Company. Registered professional engineer, California.

SCHLEICHER, HELMUT L. (1970) Architecture
 B.A., Kaiser-Friedrich City College, Germany, 1936; M.S., Institute of Technology, Germany, 1945; Ph.D., University of Munich, Germany, 1948; additional graduate study, University of Hawaii.
 Experience: Chief planner and associate, Kaiser Engineers International, Oakland; Vice Pres./General Manager, Allied Pacific & W&F Mech. Contract., Hawaii; manager, mechanical division, Alliance Companies, Los Angeles & Hawaii; project engineer, Dillingham Corp./Haw Dredging & Construction, Hawaii; construction superintendent, various firms in California. Registered Industrial Consultant, Germany; licensed general and mechanical contractor, Hawaii.

SCHROEDER, WALTER P. (1957) Head, Education Department
 B.S., Michigan State University, 1940; M.A., 1947; Ph.D., 1953.
 Experience: Three years technical and management work in agriculture, business and industry; teacher, supervising teacher, and administrator in junior and senior high schools and unified districts, assistant professor, vocational education and education, Michigan State University; assistant placement director, Michigan State University.

Faculty and Staff

- SCHWARTZ, KENNETH E. (1952)**.....Director, School of Architecture and Environmental Design
B. Arch., University of Southern California, 1952; additional graduate study, Pennsylvania State, Rensselaer Polytechnic Institute.
Experience: Draftsman, Douglas Aircraft Company; draftsman-designer, various Los Angeles architectural firms; private practice, San Luis Obispo; San Luis Obispo Planning Commission; Mayor, San Luis Obispo. Registered architect, California.
- SCOTT, CHESTER H. (1952)**.....Mathematics
B.A., Municipal University of Wichita, 1938; electronics diploma, U.S. Navy, 1945; M.S., Montana State College, 1950; additional graduate study, Stanford University.
Experience: Instructor, Sheridan High School, Wyoming; instructor, mathematics and navigation, Civilian Pilot Training School; counselor, Y.M.C.A.; instructor, mathematics, electronics, U.S. Navy; assistant professor, mathematics; Montana School of Mines; statewide counselor, University of Montana.
- SCOTT, JACK F. (1967)**.....Agricultural Management
B.S., Municipal University of Wichita, 1961; M.A., 1967.
Experience: Director of Vocational Agriculture, Galt Joint Union High School, Galt.
- SCOTTO, KENNETH C. (1970)**.....Animal Science
B.S., California State Polytechnic College, San Luis Obispo, 1966; M.S., University of Nevada, 1969.
Experience: Instructor, University of Nevada, Reno; graduate research assistant, University of Nevada; ranch and farming operations, California.
- SEABERG, DUANE O. (1965)**.....Agricultural Management
B.S., California State Polytechnic College, 1960; M.A., 1963.
Experience: Farming; instructor, Ferndale Union High School.
- SEEBER, GLENN E. (1954)**.....Welding and Metallurgical Engineering
A.B., 1949; M.A., 1950, Chico State College.
Experience: Instructor in biology and welding, Lassen Union High School and Junior College; welder and foreman, Interstate Steel Co., Chico; welder, Anderson's Welding Shop, Chico; welder and foreman, Pollock Shipbuilding Corp., Stockton; locomotive fireman, Western Pacific Railroad.
- SENNETT, ROBERT EARL (1970)**.....Aeronautical Engineering
B.S., University of Pennsylvania, Philadelphia, 1959; M.S., 1961; Ph.D., 1963.
Experience: Assistant professor, University of California, Santa Barbara; senior structural dynamicist, General Motors Defense Research Laboratories, Santa Barbara; assistant instructor-teaching fellow, University of Pennsylvania; research engineer, Dyna/Structures, Inc., Springfield, Pennsylvania.
- SERVATIUS, OWEN L. (1947)**.....Head, Business Administration Department
B.S., California State Polytechnic College, 1959; M.A., 1964.
Experience: Brokers' clerk, Baker-Fentress & Co., Chicago, Illinois; U.S. Navy; supervising clerk, California State Polytechnic College.
- SETTLE, ALLEN K. (1970)**.....Social Sciences
B.A., University of California, Santa Barbara, 1966; M.A., 1967; Ph.D., 1970.
Experience: Instructor, Santa Barbara City College; intern-fellow, American Political Science Association; research assistant, University of California, Santa Barbara.
- SEVIER, BARBARA (1969)**.....Women's Physical Education
B.A., San Jose State College, 1949; M.A., Columbia University, 1952; Ph.D., University of Utah, 1969.
Experience: Instructor and acting chairman, women's physical education, California Western University; instructor, Monterey Peninsula College; instructor and head, girl's physical education, Armijo Union High School, Fairfield; instructor, girl's physical education, Porterville Union High School.

Faculty and Staff

- SHAH, RAMESH T. (1969)**.....Mechanical Engineering
B.E., Maharaja Sayajirao University of Baroda, India; Dr. Ing., Hochschule Fur
Schwermaschinenbau, Magdeburg, Germany, 1959.
Experience: Professor, reader, lecturer, and demonstrator, Faculty of Technology
and Engineering, University of Baroda, Baroda, India.
- SHAW, MARY E. (1963)**.....Placement Supervisor
B.S., Texas Women's University, 1941.
Experience: Service representative, Pacific Telephone, San Luis Obispo; social
worker, San Luis Obispo County Welfare Department; receptionist, intermediate
clerk, placement interviewer, California State Polytechnic College.
- SHEIK, HABIB (1967)**.....Foreign Language and Linguistics
B.S., Fresno State College, 1959; A.B., 1960; M.A., California State Polytechnic
College, 1961; M.A., University of California at Los Angeles, 1966.
Experience: English tutor, project "Upward Bound," University of California;
instructor, Vietnamese Leadership/Scholarship Program, California State Poly-
technic College.
- SHERMAN, ROGER L. (1961)**.....Business Administration
A.B., Ohio University, 1949; M.S., 1950.
Experience: Personnel representative, United Airlines; personnel supervisor, Boe-
ing Airplane Company; employment and training manager, Hiller Aircraft Corpora-
tion; personnel manager, Dalmio Victor; personnel manager, Hazel Atlas Glass
Company; personnel representative, Lockheed Aircraft Corporation; assistant pro-
fessor of business, Texas A. & M.; extension instructor, University of California at
Los Angeles and University of Washington; instructor in business management,
Dar es Salaam Technical College, U.S. AID program, Tanzania.
- SHIRK, CARL D. (1968)**.....Medical Officer
B.S., University of California, Berkeley; M.D., University of California Medical
Center, San Francisco, 1961.
Experience: Internship, San Diego County Hospital; residency, Stanislaus County
Hospital; general practice, Oakdale, California.
- SHRODE, L. IRENE (1965)**.....Graduate Nurse
R.N., Knapp College of Nursing, Santa Barbara.
Experience: Warren State Hospital, Warren, Pennsylvania; Sierra Vista Hos-
pital, San Luis Obispo.
- SILVA, GEORGE L., Lt. Col. (1967)**.....Military Science
B.S., University of San Francisco, 1965. Graduate: Artillery School, 1954, 1956;
Air Defense School, 1962; Defense Language Institute (Thai), 1966.
Experience: Assistant operations officer, Los Angeles Air Defense: Air Defense
detachment commander, U.S. Army Caribbean; artillery battery commander, 8th
U.S. Army; personnel officer, 23rd Artillery Group; assistant U.S. Army attaché,
Laos.
- SILVER, GORDON A. (1964)**.....Physics
B.S., University of California, Los Angeles, 1959; M.S., 1961; additional study,
University of California, Berkeley.
Experience: Instructor, American Television Labs, Los Angeles Valley College;
research engineer, Electrosonic Systems, Inc.; associate investigator, Children's Hos-
pital, Los Angeles, California.
- SIMMONS, JAMES E. (1966)**.....English
B.A., University of California, Santa Barbara, 1959; M.A., University of Wiscon-
sin, 1960; Ph.D., 1966.
Experience: Teaching assistant, University of Wisconsin; instructor, Wisconsin
State University.

Faculty and Staff

SIMMONS, ORIEN W. (1961)..... Welding and Metallurgical Engineering
B.S.E., University of Michigan, 1935; M.S.E., 1948.

Experience: Metallurgist, Carnegie-Illinois Steel Company; Packard Motor Car Company; instructor, Rose Polytechnic Institute; officer U.S. Navy; research engineer, Battelle Memorial Institute; senior research engineer, Frankford Arsenal; Rem Cru Titanium Company and Crucible Steel Company; Climax Molybdenum Company; registered professional engineer, Ohio and California.

SIMMONS, STEVAN M. (1970)..... Men's Physical Education
B.A., Chapman College, 1965; graduate work, California State College at Los Angeles.

Experience: Security officer, Disneyland; assistant track coach, Chapman College; teacher and co-chairman, Boys Physical Education, Bret Harte Junior High School, Los Angeles.

SMITH, ELIZABETH M. (1968)..... Library
B.A., University of California, Los Angeles, 1929; Graduate, Library School of the Los Angeles Public Library, 1930.

Experience: Librarian, head librarian, Tropico Branch, Glendale Public Library.

SMITH, GLORIA (1968)..... Counselor
A.B., Howard University, Washington, D.C., 1948; M.A., 1950; additional graduate study, University of Redlands.

Experience: Teacher, Riverside; English department head, Santa Maria Joint Unified High School District.

SMITH, HOWARD F. (1968)..... Economics
A.B., Wayne State University, 1940; M.B.A., Harvard University, 1942; M.A., American University, 1952; Ph.D., American University, 1963.

Experience: Economist, War Production Board; economic advisor, supreme commander for Allied Powers, Tokyo and Okinawa; international economist, Department of State; foreign service officer, Thailand, Ceylon, Congo; member of Presidential Study Mission to Korea; deputy director, U.S. Aid Mission, Congo; coordinator, U.S. Aid to Africa; director, Ghana Aid Program, officer, U.S. Army.

SMITH, J. MURRAY (1960)..... Speech
B.A., University of Denver, 1940; M.A., 1947.

Experience: Instructor in English and speech, Denver University, Michigan State University and Wichita University; technical director, Denver Civic Theater; president, The Knitter Company (mfg.), Denver; staff director, Pasadena Playhouse; officer, U.S. Marine Corps.

SMITH, M. EUGENE (1946)..... Head, History Department
A.B., University of California, 1934; M.A., 1937; Ed.D., University of Oregon, 1958; additional graduate study, University of California.

Experience: Instructor and coach, Piedmont High School, Piedmont; graduate assistant, Universities of California and Oregon; officer, U.S. Army; Head, Social Sciences Department, California State Polytechnic College.

SMITH, NELSON L., III (1962)..... Industrial Technology
B.S., Lowell Technological Institute, 1960; M.S., 1962.

Experience: Senior systems analyst, quality control engineer, Raytheon Company, Lowell, Massachusetts.

SMITH, R. ELBERTON (1970)..... Economics
B.A., College of Wooster, Ohio, 1935; M.A., University of Chicago, 1946; Ph.D., 1947.

Experience: Program economist, USAID Mission to Turkey; program economist and commodity import advisor, U.S. Mission to Cambodia; program economist, ICA Mission to Japan, economic advisor to Japan Productivity Center; economic historian and author, Office of Military History, War Department and Department of the Army; officer, U.S. Navy; economist, War Production Board; visiting professor, Indiana University; lecturer, University of Maryland; professor, Northwestern University; instructor, University of Denver; branch manager, B. B. Kirkbride Bible Company; divisions expert, Elgin, Joliet and Eastern Railway.

Faculty and Staff

- SMITH, WARREN T. (1952)**..... Chief of Party, Thailand Project
B.S., University of California, 1943; M.S., University of California, Davis, 1953.
Experience: Forester, United States Forest Service; U.S. National Park Service; stores, U.S. Navy (civilian); director of vocational agriculture and critic teacher, Madera Union High School; Dean, School of Agriculture.
- SNETSINGER, JOHN G. (1970)**..... History
A.B., University of California, Berkeley, 1963; M.A., 1966; Ph.D., Stanford University, 1969; additional graduate study, Stanford School of Law.
Experience: Instructor, San Jose State College.
- SNODGRASS, OLIVER T. (1967)**..... Mathematics
B.S., Dakota Wesleyan University, 1924; M.S., University of Iowa, 1927; Ph.D., University of Missouri, 1937.
Experience: Principal, Bison High School, Wetonka Public Schools; instructor, Purdue University, Montana School of Mines, University of Missouri; professor, Yankton College, Western New Mexico University.
- SORENSEN, L. ROBERT (1966)**..... Head, Psychology Department
B.A., Pomona College, 1948; M.A., Claremont Graduate School, 1951; Ph.D., 1966.
Experience: Assistant to dean of students, Pomona College; lecturer, assistant director Industrial Relations Center, administrative assistant Jet Propulsion Lab. and associate director of development, California Institute of Technology; assistant in development, assistant dean, Claremont Graduate School.
- SPARLING, SHIRLEY R. (1963)**..... Biological Sciences
B.S., Iowa State College, 1950; M.S., 1951; Ph.D., University of California, 1956; additional graduate study, University of Michigan, Stanford University.
Experience: Instructor, Central College; lecturer and instructor, University of British Columbia; instructor and assistant professor, University of California at Santa Barbara; University of Oregon Institute of Marine Biology.
- SPENCER, RUTH G. (1967)**..... Library
B.A., Milwaukee-Downer College, 1938; B.L.S., University Library of Chicago, 1945; additional graduate study, University of Wisconsin.
Experience: Cataloger and reference librarian, Milwaukee Public Library; librarian, U.S. Public Health Service, Cincinnati; cataloger, Northrop Aircraft; reference librarian, Los Angeles Public Library.
- STAHL, VERLAN H. (1968)**..... Foreign Language and Linguistics
B.A., College of the Pacific, 1950; M.A., Florida State University, 1955; Ph.D., University of Madrid, 1969.
Experience: American program officer, Fulbright Commission and in-service engineer, Standard Electric Co., Madrid; instructor, Wake Forest College, Winston-Salem; teaching assistant, Florida State University; secretary to Vice President, W.B. Camp & Sons, Inc., Bakersfield.
- STALLARD, MARY L. (1965)**..... Women's Physical Education
B.A., Fresno State College, 1957; M.S., University of Washington, 1965.
Experience: Instructor, Hamilton Junior High, Fresno; teaching assistant, University of Washington.
- STANSFIELD, WILLIAM D. (1963)**..... Biological Sciences
B.S., California State Polytechnic College, 1953; M.A., 1959; M.S., University of California, Davis, 1962; Ph.D., 1963.
Experience: Cadet teacher, Chaffey Union High; line officer, U.S. Naval Reserve; vocational agriculture teacher, Fortuna Union High School; teaching assistant and research assistant, University of California.
- STEARNS, JOSEPHINE S. (1969)**..... Child Development
B.S., University of New Hampshire, 1958.
Experience: Nursery school teacher, Lansing, Michigan; associate 4-H Youth Development Agent, Milford, N.H.; utility demonstrator, Malden, Massachusetts.

Faculty and Staff

- STECHMAN, JOHN V. (1960)**.....Animal Science
 B.S., University of California, Davis, 1957; M.S., 1960.
 Experience: Range aid, U.S.D.A. Forest Service, Agricultural Research Service; research assistant, University of California, Davis; biological assistant, U.S. Army; range consultant, State of California, Modoc County, Kern County, and private industry.
- STEELE, F. RAYMOND, JR. (1968)**.....Head, Food Industries Department
 B.A., California State Polytechnic College, 1956; M.S., Cornell University, 1967; Ph.D., 1968.
 Experience: Teaching assistant, University of Southern California; division manager, Sears Roebuck and Co.; brewer, Pabst Brewing; instructor, California State Polytechnic College; participant, Academic Year Institute, radiation biology, and research assistant, Department of Food Science, Cornell University; naval aviator, U.S.N.R.
- STEFANAC, JOSEPH B. (1958)**.....Computer Science & Statistics
 B.S., U.S. Naval Academy, 1926; M.S., Purdue University, 1958.
 Experience: Captain, U.S. Navy (retired); marine engineering design, Bureau of Ships, Navy Department; engineering and command duties, U.S. Navy ships; mathematics instructor, Purdue University; participant National Science Foundation Institute, Stanford University, 1960.
- STEINBERG, HOWARD (1970)**.....Mathematics
 B.M.E., City College of New York, 1950; M.S. New York University Graduate School, 1966; Ph.D., 1969.
 Experience: Manager of Missile Equipment and Ordinance Department, Maxson Electronics Corp.; manager mechanics program, Kollsman Instrument Corp.; engineering and mathematical consultant; assistant professor, Mathematics Research Center, University of Wisconsin.
- STEUCK, FRED H. (1947)**.....Electronic Engineering
 B.S., Iowa State College, 1937.
 Experience: Engineer, Nebraska Power Co.; manager, O'Brien Co.; Rural Electric Co-op., Iowa; instructor, Iowa State College; officer, U.S. Navy; registered professional engineer, California.
- STOFFEL, EDWARD O. (1957)**.....Mechanical Engineering
 B.M.E., University of Santa Clara, 1950; M.E., University of Santa Clara, 1955; M.S.M.E., Oregon State University, 1968.
 Experience: Engineer, Autonetics, Aerojet-General, Northrup Aircraft; Robertshaw-Fulton Controls, Norris-Thermador Corp.; chemist, U.S. Industrial Chemicals; registered professional engineer, California.
- STONER, HOWARD F. (1960)**.....Mechanical Engineering
 B.S., U.S. Naval Academy, 1932; M.S., Massachusetts Institute of Technology, 1941.
 Experience: U.S. Navy, operations officer for U.S. submarines; supervisor of ship-building, Electric Boat Co.; repair and construction superintendent, Mare Island Shipyard; production officer, Long Beach Naval Shipyard.
- STONER, NEALE R. (1969)**.....Men's Physical Education
 B.A., California State College, Fullerton, 1962; graduate study, San Diego State College.
 Experience: Assistant supervisor of physical education, University of California, San Diego; business service officer, California State College, Fullerton; U.S. Army.
- STOOKEY, ELLEN T. (1961)**.....Home Economics
 B.S., University of Illinois, 1943; M.A., 1950; additional graduate study, Stanford University.
 Experience: Elementary teacher, Illinois; vocational home economics teacher, Illinois; supervising teacher, University of Illinois; teacher trainer, University of Illinois; special service, U.S. Army Air Force; regional supervisor, Bureau of Home-making Education, California State Department of Education.

Faculty and Staff

- STRASSER, J. EDWARD (1960)** Industrial Technology
 B.S., California State Polytechnic College, 1958; M.B.A., Golden Gate College, 1967.
 Experience: Construction mechanic, Pacific Electric Company, Anchorage, Alaska; machinist, MEFCO Mfg., Glendale; draftsman, I.D.S., Inc., Glendale; tool and die maker, Arrowsmith Tool & Die Corp., Los Angeles; sales engineer, O'Brien Machinery, Inc., Los Angeles; control systems analyst, the Boeing Company, Seattle.
- STRAUSS, L. HARRY (1961)** College Librarian
 B.S., George Williams College, 1935; M.A., Graduate Library School, University of Chicago, 1942; additional graduate study, University of Michigan.
 Experience: Librarian, George Williams College; Chicago College of Osteopathy; Northwestern Michigan Junior College; instructor in audio-visual education, University of Oklahoma; audio-visual consultant, National Council of the Y.M.C.A.; executive secretary, Commission on Motion Pictures in Adult Education; superintendent of schools, Rapid City and Cedarville, Michigan.
- STREICHERT, GRETCHEN C. (1958)** Home Economics
 B.S., Oregon State College, 1936; M.S., 1951.
 Experience: Teacher, high schools; home adviser, University of California Agricultural Extension; nursery school supervisor and instructor, Oregon State College; instructor, Modesto Junior College; personnel field counselor, Oregon Shipbuilding Corporation; teacher-counselor, Oregon State School for Girls.
- STRICKMEIER, HENRY B. (1970)** Mathematics
 B.S., Texas Luthern College, 1962; M.A., University of Texas, 1967; Ph.D., 1970.
 Experience: Teacher, Galveston Independent School District; teaching assistant and teaching associate, University of Texas.
- STROHMAN, ROLLIN D. (1969)** Agricultural Engineering
 B.S., University of Illinois, 1962; M.S., 1965; Ph.D., Purdue University, 1969.
 Experience: Research Engineer, John Deere Company; Agricultural Engineer, USDA, ARS, WORDD.
- STRUBLE, DONALD E. (1970)** Aeronautical Engineering
 B.S., California State Polytechnic, 1964; M.S., Stanford University, 1967; Ph.D., Georgia Institute of Technology, Atlanta, Georgia, 1969.
 Experience: Management trainee, Pacific Telephone and Telegraph Company; development engineer, draftsman, Aerojet-General Corporation.
- STUART, JOHN S. (1964)** Architecture
 B. Arch., Texas Technological College, 1950; additional graduate study, Pennsylvania State University, MIT.
 Experience: Private practice, Schmidt & Stuart; designer and supervisor, Atcheson & Atkinson, Architects. Registered architect and registered engineer, Texas.
- STUBBS, DANIEL F. (1963) (1968)** Computer Science & Statistics
 B.S., Purdue University, 1960; M.S., Rensselaer Polytechnic Institute, 1962; additional graduate study, Purdue University, University of California, Berkeley, Rensselaer Polytechnic Institute.
 Experience: Teaching assistant, Purdue University; engineer, Knolls Atomic Power Laboratory; instructor, California State Polytechnic College, San Luis Obispo.

Faculty and Staff

SULLIVAN, GERALD J. (1968) English
B.A., University of Wichita, 1957; M.A., University of Oklahoma, 1959; Ph.D., 1964.

Experience: Instructor, University of Wisconsin, University of Arizona; teaching assistant, University of Oklahoma; assistant professor, University of North Texas State.

SUMMERS, MARY JO (1962) Graduate Nurse
R.N., University of Oregon, Eugene, 1939; B.S., 1939.
Experience: Los Angeles County Hospital.

SWANSON, CLIFTON E. (1967) Music
B.A., Pomona College, 1963; M.M., University of Texas, 1965; additional graduate study, University of California.

Experience: Teaching assistant, University of Texas, University of California; visiting assistant professor, Portland State College; member, Group for Contemporary Music, Portland.

SWICKARD, S. ERNEST (1970) Architecture
B. Arch., California State Polytechnic College, San Luis Obispo, 1967; M. Arch., University of California at Los Angeles, 1970.

Experience: Research assistant, University of California at Los Angeles; architect urban designer, Welton Becket & Assoc., Los Angeles, and William L. Pereira, Los Angeles; architect designer, Naramore, Bain, Brady & Johnson, Washington; architect draftsman, Dexter, Stark & Hoff, Pismo Beach.

SYKES, ROBERT N. (1969) Mechanical Engineering
B.S., University of North Dakota, 1962; M.S., 1965.

Experience: Engineer, Babcock and Wilcox Company, Research Center, Alliance, Ohio; engineer and draftsman, Saskatchewan Power Corporation, Saskatchewan, Canada; instructor, University of North Dakota; engineer, Bechtel Corporation, San Francisco.

SZIGETHY, NICHOLAS (1961) Library
Ph.D., Erzebet University, Pecs, Hungary, 1940; M.L.S., Columbia University Library School, 1958.

Experience: Columbia University School of Business Library; cataloger, Cornell University Library; cataloger, University of Nevada Library.

TALBOTT, LAURENCE F. (1966) Industrial Technology
A.B., San Diego State College, 1951; M.B.A., University of Southern California, 1965; additional graduate study, University of Southern California.

Experience: Manager Test Quality Control, Rocketdyne; plant engineer, Space and Information Systems, Division North American Aviation, Inc.; chief facilities engineer, chief industrial engineer, plant engineer, Autonetics; electrical engineer, Convoir, San Diego; C. F. Braun and Company, Alhambra; sales engineer, California Electric Works, San Diego, Registered professional engineer, California.

TELLEW, FUAD H. (1960) Head, Economics Department
B.S., College of Commerce and Economics, Baghdad, Iraq, 1950; M.A., University of Southern California, 1954; Ph.D., 1959.

Experience: Accountant, Engineering Department, Iraqi State Railways; supervisor, Testing Bureau, University of Southern California; teaching assistant and lecturer, University of Southern California.

TERRY, CLIFFORD F., LTC (1970) Military Science
B.S., University of Missouri, 1954. Graduate: Artillery School, 1962; U.S. Army Command and General Staff College, 1968.

Experience: Assistant S-3, 534th Field Artillery Battalion, U.S. Army, Europe; Battery Commander, Fort Lewis, Washington; Assistant Inspector General, Fort Amador, Canal Zone; Operations Staff Officer, U.S. Military Assistance Command, Vietnam; Battalion Commander, 1st Battalion, 27th Artillery, Vietnam.

- THOMAS, ARTHUR L. (1969)**.....Chemistry
 A.B., Columbia College, 1951; Ph.D., Princeton University, 1956.
 Experience: Research supervisor, E. I. du Pont de Nemours & Co., Inc.; chemical engineer, Standard Ultramarine & Color Co., Inc.; research supervisor, Plasmachem Inc., & MHD Research, Inc.
- THOMAS, GUY H., JR. (1968)**.....Graphic Communications
 B.S., California State Polytechnic College, 1953.
 Experience: Equipment technician, California State Polytechnic College; chief machinist, Union-Tribune Publishing Company, San Diego; head machinist, Magoffin Typographers, Hollywood and Evening Outlook, Santa Monica; machinist, Chicago Sun-Times; field engineer, Mergenthaler Linotype Company, Chicago and San Francisco.
- THOMAS, JOHN W. (1968)**.....Biological Sciences
 B.A., Los Angeles State College, 1957; Ph.D., University of Southern California, Los Angeles, 1968.
 Experience: Chemist, Atkinson Laboratory; public health microbiologist, Los Angeles City Health Department; teacher, Durate Unified School District; research associate, University of Southern California.
- THOMSON, DAVID H. (1946)**.....Biological Sciences
 B.S., University of Arizona, 1944; M.A., Claremont Graduate School, 1948; additional graduate study, Oregon State College and University of Oregon.
 Experience: Laboratory instructor, Pomona College; ranger-naturalist, Sequoia National Park.
- THRASHER, FRANK P. (1963)**.....Crops Science
 B.S., Montana State College, 1951; M.S., 1963.
 Experience: Recruit instructor, U. S. Navy; farmer-owner, Bozeman, Montana; research agronomist, Agricultural Research Service, U.S. Department of Agriculture, Bozeman, Montana.
- THURMOND, WILLIAM (1951)**.....Biological Sciences
 A.B., University of California, 1948; M.A., 1950; Ph.D., 1957.
 Experience: Instructor, San Mateo Junior College; associate in zoology, University of California; instructor, summer session, University of California, 1957-59; Director, National Science Foundation, Summer Science Training Program for secondary students, California State Polytechnic College.
- TICE, RUSSELL L. (1965)**.....Chemistry
 B.S., Marshall University, 1960; Ph.D., University of California, Los Angeles, 1965.
 Experience: Teaching and research assistant, University of California, Los Angeles; U.S. Navy.
- TIMONE, BARNEY R. (1969)**.....Assistant to the Dean of Students
 B.A., Chico State College, 1965; M.A., Idaho State University, 1969.
 Experience: Teacher, Chico Unified School District; head resident and placement interviewer, Idaho State University.
- TODD, WILLIAM A., CPT. (1969)**.....Military Science
 B.S., University of Washington, 1961; U.S.A. Armor and Engineer's School, 1962.
 Experience: Command and staff assignments in U.S. Army Corps of Engineers in Europe, Vietnam and Korea.
- TOONE, HARMON (1952)**.....Head, Dairy Science Department
 B.S., University of Idaho, 1940; M.A., California State Polytechnic College, 1956.
 Experience: Director of vocational agriculture at Moreland, Ucon, and Firth high schools, Idaho; superintendent, Firth High School, Idaho; director of vocational agriculture, Riverdale High School; special supervisor, Bureau of Agricultural Education.

Faculty and Staff

TOWNSEND, NEAL R. (1965).....Mathematics
B.S., Wisconsin State College, 1953; M.A., San Diego State College, 1961; additional graduate study, Claremont Graduate School, University of Georgia, Purdue University.

Experience: Teacher, San Bernardino City Schools, Grossmont Union High School District; assistant professor, Wisconsin State University.

TREMBLY, DEAN (1961).....Counselor
A.B., Colorado College, 1933; M.A., 1946; Ed.D., University of Illinois, 1961.
Experience: Industrial personnel consultant, Human Engineering Laboratory, Fort Worth, Texas; testing and counseling, University of Illinois.

TROUTNER, WILLIAM R. (1942).....Crops Science
Vocational Certificate, California State Polytechnic College, 1934; B.S., University of California, Davis, 1938.

Experience: Agriculture instructor, Pomona High School and Junior College; agriculture instructor and critic teacher, San Luis Obispo Senior High School.

TROY, BERNARD A. (1970).....Education
B.A., University of Notre Dame, 1957; S.T.L., Universidad Catholica de Chile, 1961; M.A., University of Notre Dame, 1965.

Experience: Chaplain/Foreign Student Advisor, University of Notre Dame; chaplain, St. Charles Boys' Home, Milwaukee; curate, Diocese of Santiago de Veraguas, Santiago; teacher/counselor/school psychologist, Monrovia Unified School District.

TRUEX, JOSEPH W. (1954).....Graphic Communications
B.S., California State Polytechnic College, 1952; M.S., South Dakota State University, 1966.

Experience: Floorman, San Luis Obispo Telegram-Tribune. Printer: Santa Maria Advertiser; Williams Press, Flushing, New York; H. W. Wilson Company, New York City, U. S. Navy.

TSENG, JAMES H. W. (1969).....Electronic Engineering
LL.B, National Taiwan University, Republic of China, 1950; LL.M, Southern Methodist University, Dallas, Texas, 1957; B.S., Illinois Institute of Technology, Chicago, Illinois, 1964; M.S., 1966.

Experience: Judge, Taitung and Taichung District Courts; secretary and section chief, Justice Department, Republic of China; teaching assistant, Illinois Institute of Technology; test engineer, Northern Indiana Public Service Corporation, Hammond, Indiana; research and development engineer, Research and Development Division, Advance Ross Electronics Corporation, Addison, Illinois; assistant professor, Purdue University Calumet Campus, Hammond, Indiana.

TURNER, PEARL (1951).....Library
A.B., San Jose State, 1937; M.S., University of Southern California, 1949; M.L.S., Texas Women's University, 1951; additional graduate study, University of Washington.

Experience: Teacher in elementary schools, Visalia, Los Angeles, Riverside; officer, U. S. Navy.

VAN DE VANTER, GORDON L. (1960) (1968).....Crop Science
B.S., California State Polytechnic College, 1953; M.A., 1965; additional graduate study, University of California, Davis.

Experience: Commercial vegetable grower, owner-manager. Contract logging and excavation operation. Aerographer, USNR.

Faculty and Staff

VANONCINI, LESLIE J. (1965).....Agricultural Management
B.S., California State Polytechnic College, 1946; M.A., 1953; additional graduate study, University of California, Davis, University of California, Berkeley, University of Southern California.

Experience: Director vocational agriculture, Santa Maria High School and Junior College; director work education, Santa Barbara County Schools; director counseling and guidance, Santa Maria High School; director adult education and dean, evening division, Allan Hancock College.

VAN WYNGAARDEN, WILLEM L. (1965).....Physics
B.S., McMaster University, 1961; M.S., University of Manitoba, 1964; additional graduate study, University of Manitoba.

Experience: Instructor, Methodist College.

VARNEY, ALVIN DAVID (1969).....Engineering Technology
B.S., LeTourneau College, Longview, Texas.

Experience: Machinist, Krause Corporation, Hutchinson, Kansas, LeTourneau College, Longview, Texas and U. S. Industries, Longview; trainee, Field Enterprises, Longview; product engineer, John Deere Company, Des Moines, Iowa, and Vernon, California.

VARTAN, ROBERT P. (1967).....Business Administration
B.A., University of Michigan, 1936; M.B.A., 1937; C.P.A., 1946; J.D., University of Toledo, 1955.

Experience: Supervising senior, Price Waterhouse & Company; chief of audit section, financial analyst, adviser to Renegotiation Board, Detroit Ordnance District; instructor, University of Detroit; controller and assistant treasurer, Greer Hydraulics, Inc.; controller for Plymouth Body Plant, divisional controller for Airtemp Division, Chrysler Corporation; vice president-finance, assistant treasurer, assistant secretary, Dot Records, Inc.; vice president-finance, Ranwood Records, Inc.; controller, secretary and treasurer of ICC Van Nuys Skyways, Inc. and Golden West Airlines, Inc.; independent consultant service.

VOELTZ, HERMAN C. (1965).....History
B.A., University of Chicago, 1943; M.A., 1949; Ph.D., University of Oregon, 1960.

Experience: Instructor, 83 Div I and E School, Bad Ischl, Austria; instructor and associate professor, Division of Continuing Education, University of Oregon; assistant professor, Oregon State University; associate professor, Western New Mexico University; U.S. Army.

VOLIN, SUZANNE L. (1970).....Child Development
B.S., South Dakota State University, 1968; M.S., Kansas State University, 1970.

Experience: Head Start teacher, Sisseton, South Dakota, and Kansas City, Missouri; graduate teaching assistant and assistant instructor, Kansas State University.

VON WERLHOF, JAY C. (1967).....History
B.A., University of California Berkeley, 1950; M.A., 1952; additional graduate study, University of Southern California, Los Angeles.

Experience: Instructor, librarian, California School Fine Arts; instructor, College Sequoias; archaeologist, University of California, Berkeley, Los Angeles; teacher, librarian, Plumas Unified School District, Coast Joint Union; teacher, Siskiyou School District; historical guide, San Simeon State Historical Monument; instructor, Grossmont College; lecturer, Chico State College.

VORHIES, RALPH M. (1946).....Crops Science
B.S., University of Missouri, 1938; M.A., 1941; Ed.D., 1964.

Experience: Agriculture instructor at Belton and Couch High Schools, Missouri; instructor, Southeast State Teachers College, Cape Girardeau, Missouri; horticulture adviser, USAID Guatemala; officer, U.S. Navy.

Faculty and Staff

VOSS, LARRY R. (1968) Director, Personnel Relations
B.A., Sacramento State College, 1956; graduate study, Sacramento State College and California State College at Los Angeles.

Experience: Placement supervisor, Sacramento State College; assistant personnel officer, California State Department of Education, Sacramento; senior personnel analyst, Chancellor's Office, Trustees of the California State Colleges, Los Angeles; assistant director, U.S. Office of Education project: "Improvement of Personnel Administration in State Education Agencies", Los Angeles.

WAELTI, HENRY (1969) Agricultural Engineering
B.S., Oregon State University, 1957; M.S., Purdue University, 1960; Ph.D. Iowa State University, 1967.

Experience: Product development engineer, John Deere Company, Moline, Illinois; maintenance supervisor, Western Farmers Association, Tacoma, Washington; associate professor, South Dakota State University, Brookings, S. Dakota; Registered Professional Engineer.

WAGNER, ORVIN E. (1969) Physics
B.A., Walla Walla College, 1953; B.S., 1959; M.S., Arizona State University, 1963; Ph.D., University of Tennessee, 1968.

Experience: Teaching and research assistant, Arizona State University; manager of basic research, Electron Division, Controls Company of America; scientist, Lockheed Research Laboratories; instructor, Walla Walla College; NIH radiological health physics fellow, University of Tennessee and Oak Ridge National Laboratory; A.E.C. postdoctoral fellow at Oak Ridge National Laboratory.

WAHL, WILLIAM B. (1966) English
B.A., San Francisco State College, 1953; M.A., 1954; additional graduate study, Stanford University.

Experience: Assistant instructor, San Francisco State College; student teacher, Balboa High School; teacher, Sequoia High School; instructor, College of San Mateo.

WAI, ANGLI (1967) Child Development
A.B., M.A., Scarritt College, Nashville, 1953.

Experience: Instructor, Berea College, Berea, Kentucky; teacher, State University of Iowa and Randolph Macon Woman's College.

WALKER, HOWARD D. (1957) Chemistry
B.A., New York University, 1947; M.S., 1948; Ph.D., U.C.L.A., 1955.

Experience: U.S. Public Health Service, postdoctorate fellow, American Meat Institute Foundation, University of Chicago; group leader, Veterans Hospital, Downey, Illinois; instructor, Northwestern University.

WALKER, ISAAC N. (1967) English
B.S., Northwestern University, 1953; M.A., University of Texas, 1955; Ph.D., 1965.

Experience: Teaching assistant, special instructor, University of Texas; instructor, Southwest Texas State College; instructor, Del Mar College, Corpus Christi; assistant professor, North Texas State University.

WALKER, WALTER A. (1963) Counselor
A.B., New School for Social Research, 1950; graduate study, New York University.

Experience: Supervising psychologist, Rockland County New York Center for Mental Health; psychotherapist, Rockland Consultation Center; certified psychologist, New York.

WALL, LEONARD W. (1969) Physics
B.S., Louisiana Polytechnic Institute, 1963; Ph.D., Iowa State University, 1969.

Experience: Physical science aide, U.S. Waterways Experiment Station; laboratory assistant, Louisiana Polytechnic Institute; graduate teaching assistant and research assistant, Iowa State University; assistant professor, University of Kansas.

Faculty and Staff

- WALLACE, WILLIAM C. (1969)**.....Co-Director, Educational Opportunity Program
B.S., California State Polytechnic College, San Luis Obispo, 1967.
Experience: Group supervisor, senior group supervisor, senior youth counselor, and classification counselor, California Youth Authority, the Paso Robles School for Boys.
- WALTERS, DIRK R. (1969)**.....Biological Sciences
B.S., Western Illinois University, 1965; M.A., Indiana University, 1966; Ph.D., 1969.
Experience: Teaching associate, Indiana University; instructor, Orange County (New York) Community College.
- WARD, CLARENCE H. (1966)**.....Men's Physical Education
B.A., California State Polytechnic College, 1965; M.A., 1966.
Experience: Recreation intern, correctional officer, California Men's Colony; summer swimming instructor, California State Polytechnic College.
- WARD, EDWARD JOHN (1970)**.....Architecture
B.S., University of Massachusetts, 1962; M.U.P., Michigan State University, 1964.
Experience: Director, Planning & Research Division, Community Action, Pittsburgh, Inc.; director, planning, Community Action, Pittsburgh, Inc.; principal planner, Urban Renewal Division, National Capital Planning Commission, Urban Renewal & Housing Division, Washington, D.C.; Planner I, City of Miami Planning Department; graduate teaching assistant and graduate research assistant, Michigan State University.
- WARD, WESLEY S. (1954)**.....Architecture
B. of Arch., University of Southern California, 1953; additional graduate study, Spain.
Experience: Officer, flight instructor, air installations, U.S. Air Force; draftsman-designer, Everett E. Parks, Architect; design responsibility, Benedict Beckler and Kochler, Architects and Engineers; architectural practice, design and research consultation, California, Madrid, Spain; Registered Architect, California.
- WARTEN, RALPH M. (1968)**.....Mathematics
B.S., Brooklyn College, 1957; M.S. Purdue University, 1959; Ph.D., 1961.
Experience: Research and teaching assistant, Purdue University; instructor, advisory mathematician, I.B.M. Corporation, Federal Systems Division; mathematician, I.B.M. Corporation, Scientific Center.
- WATSON, HAROLD J. (1964)**.....Chemistry
A.B., Princeton University, 1944; A.M., University of Illinois, 1948; Ph.D., 1950.
Experience: Assistant, University of Illinois; chemist, Texaco, Inc.; group leader, Dan River Mills, Inc., Chemical Consultant, Danville, Va.
- WEATHERBY, JOSEPH N. JR. (1968)**.....Social Sciences
B.A., Baylor University, 1958; B.F.T., American Institute for Foreign Trade, 1961; M.A., Baylor University, 1962; Ph.D., University of Utah, 1968.
Experience: International operations, Ford Motor Company; assistant professor, Bay de Noc College.
- WEBB, JAMES L. (1969)**.....Men's Physical Education
B.S., University of North Dakota, 1962; M.S., 1963; Ph.D., University of Oregon, 1969.
Experience: Graduate assistant, University of Oregon; public school teacher, Staples, Minnesota, and Grand Forks, North Dakota; lifeguard, swimming and diving instructor, Hatton, North Dakota.
- WEBB, MYRT W., JR., CPT. (1970)**.....Military Science
B.A., University of California, 1965; Graduate: The Artillery School, 1965; Artillery and Missile School, 1968.
Experience: Chief, U.S. Army Replacement Station, Fort Lewis, Washington; Artillery Battery Commander, 24th Infantry Division, Fort Riley, Kansas; Artillery Battery Commander, 4th Infantry Division, Vietnam; Territorial Forces Advisor, MACV, Vietnam.

Faculty and Staff

- WEBER, BARBARA P. (1966)** Home Economics
B.S., University of Nevada, 1951; M.A., California State Polytechnic College, 1968, additional graduate study, UCLA Extension, University of Nevada, California State Polytechnic College.
Experience: Instructor, Allan Hancock College, Evening Division.
- WEBRE, NEIL W. (1969)** Computer Science & Statistics
B.S., Louisiana State University, 1960; A.M., Harvard University, 1968; additional graduate study, Columbia University, University Munich.
Experience: Assistant mathematician, Brookhaven National Laboratory; computer systems analyst, Columbia University; computing systems consultant, Max Planck Institute; applied mathematician, ABT Associates, Inc.
- WEBSTER, JAMES P., JR. (1965)** Agricultural Engineering
B.S., California State Polytechnic College, 1953.
Experience: U.S. Army; engineering aid, junior civil engineer, and assistant highway engineer, California Division of Highways; field survey chief and project engineer, Garing, Taylor, and Associates, Arroyo Grande.
- WEINSTEIN, STEPHEN T. (1969)** Mathematics
B.A., University of Southern California, 1960; M.A., 1965.
Experience: Engineering planner and program analyst, North American Aviation, Space & Information Systems Division; teacher, Bell High School; instructor, East Los Angeles City College; teaching and research assistant, University of Southern California.
- WENZL, MICHAEL J. (1969)** English
B.A., University of Oregon, 1961; M.A., 1965; Ph.D., University of New Mexico, 1969.
Experience: Instructor, Arizona State College, University of New Mexico.
- WESSELS, HENRY (1970)** Art
B.S., Northern Illinois University, 1957; graduate study, Northern Illinois University, California State College, Long Beach.
Experience: Teacher, Rockford, Illinois and La Mirada, California high schools; instructor, Orange Coast College, Cerritos College; owner, Studio-Gallery, Huntington Beach.
- WEST, HERMAN (1964)** Mechanical Engineering
B.S., Tufts University, 1934; M.S., Rensselaer Polytechnic Institute, 1962; additional graduate study, Rensselaer Polytechnic Institute.
Experience: Educational advisor, Civilian Conservation Corp; instructor, Biddeford High School, Hartford University; design analyst, Pratt Whitney Aircraft; research engineer, North American Aviation; president and treasurer, West Brothers Electrical Appliances.
- WEST, HOWARD (1959)** Associate Dean, Resources and Planning
B.A., Pepperdine College, 1956.
Experience: Apprentice reporter, Los Angeles Examiner; journalism instructor and acting director of public relations, Pepperdine College; editor, America's Builders; publications consultant, Southland Press; assistant to President, director, International Education.
- WEST, JOHN W. (1968)** Associate Dean, School of Agriculture
and Natural Resources
B.S.A., University of Tennessee, 1947; M.S., 1948; Ph.D., Purdue University, 1951.
Experience: U.S. Army; assistant director of research, Security Mills, Knoxville, Tennessee; associate professor of Poultry Science, Mississippi State University; professor and head, Department of Poultry Science, Oklahoma State University.
- WESTESEN, GERALD L. (1965)** Agricultural Engineering
B.S., University of California, Davis, 1958; M.S., 1963.
Experience: Junior land and water use analyst, California State Department of Water Resources; engineer and superintendent, Clear Lake Water Company, Woodland; officer, U.S.A.R.

- WHALEY, GLENN V. (1963)**.....Library
B.A., Carroll College, 1949; M.L.S., University of Wisconsin, 1953; M.A., Drake University, 1965.
Experience: Reference librarian, Drake University; librarian, Milwaukee Public Library.
- WHALLS, MARVIN J. (1968)**.....Acting Head, Natural Resources Management
Department
B.S., Michigan State University, 1951; M.S., University of Michigan, 1957; Ph.D., 1970.
Experience: Fishery research biologist, Hunt Creek Trout Research Station and research fellow, Institute for Fisheries Research, Michigan Department of Conservation; fishery biologist in charge of fisheries management and development, southern California, California Department of Fish and Game.
- WHARTON, WILLIAM M., JR. (1968)**.....History
B.S., Loyola University, 1956; M.A., University of San Francisco, 1961; additional graduate study, University of California, Berkeley, University of South Africa.
Experience: Lecturer: Comboni College, Khartoum, Sudan; assistant professor, University of San Francisco.
- WHEATLEY, PATRICK O. (1970)**.....Mathematics
B.A., St. Mary's Seminary, 1956; M.S., The University of Chicago, 1963; Ph.D., University of Houston, 1970.
Experience: Aerospace engineer, NASA, MSC, Houston, Texas; teaching assistant, University of Houston; teacher, Strake Jesuit Preparatory School, Houston, Texas.
- WHEELER, ERNEST J., JR. (1969)**.....Men's Physical Education
B.A., University of Washington, 1961; M.S., University of Southern California, 1966.
Experience: Teacher and assistant basketball coach, Compton Junior College; high school coach and teacher, Anaheim.
- WHEELER, ROBERT R. (1961)**.....Animal Science
B.S., Colorado State University, 1952; M.S., 1955, Ph.D., Oregon State University, 1962.
Experience: Irrigated farming; ranching; graduate assistant and graduate fellow in animal nutrition, Oregon State University; Junior animal husbandman, Oregon Agricultural Experiment Station.
- WHIPPLE, OMER K. (1956)**.....Chemistry
A.B., Dartmouth College, 1936; M.A., Columbia University, 1938.
Experience: Biochemical research chemist, Long Island College of Medicine; instructor in chemistry, Norwich University; research chemist, Vermont Bureau of Industrial Research; professor of quantitative analysis, University of Tulsa; chemical consultant, Tulsa, Oklahoma.
- WHITAKER, LESLIE A. (1967)**.....Chemistry
B.S., University of Denver, 1949; M.A., 1956; Ph.D., University of the Pacific, 1967.
Experience: Instructor, Littleton High School, Scottsbluff College, Cottey College, College of the Desert; teaching assistant, University of the Pacific.
- WHITE, MARY LOU (1961)**.....Head, Women's Physical Education Department
B.S., Oregon State University, 1946; M.S., Washington State University, 1953.
Experience: St. Helens, Oregon, High School instructor; physical education instructor, Clark College, Vancouver, Washington.
- WHITSON, MILO E. (1947)**.....Head, Mathematics Department
Ph.B., Washburn College, 1937; M.A., George Peabody College for Teachers, 1940; Ed.D., University of Southern California, 1949.
Experience: Teacher and administrator, Kansas; officer, U.S. Navy; lecturer, mathematics, University of Southern California.

Faculty and Staff

- WIGHT, HEWITT G. (1952)** **Chemistry**
 B.S., University of Utah, 1943; Ph.D., University of California, 1955.
 Experience: Teaching assistant, University of Utah, St. Martin's College, and the University of California; officer, U.S. Army.
- WILD, FREDERICK G. (1964)** **Mathematics**
 B.S., U.S. Coast Guard Academy, 1932; M.A.T., Duke University, 1964.
 Experience: Command of air stations at Salem, Massachusetts and Port Angeles, Washington; chief of Coast Guard Intelligence.
- WILEY, J. BARRON (1956)** **Education**
 B.S., University of Denver, 1940; M.B.A., 1948; Ed.D., Indiana University, 1955.
 Experience: Accounting and business administration, various firms; officer, U.S. Air Force; head, department of business education, Colorado Woman's College; assistant professor of air science, Indiana University.
- WILEY, RICHARD C. (1946)**
 Head, Welding and Metallurgical Engineering Department
 Special engineering courses, Stanford University; industrial arts training, San Jose State College and University of California.
 Experience: Master mechanic and welder, Utah Construction Company; welding instructor, Sacramento Junior College; Palo Alto, San Francisco, and San Jose school systems; senior welding engineer, Joshua Hendy Iron Works; field engineer, Bechtel Corporation; welding metallurgy consultant, Westinghouse Corporation; X-ray Engineering International; Linde Company, New York; registered professional engineer, California.
- WILK, EDWARD A. (1966)** **Library**
 B.A., Western Michigan University, 1965; M.S.L., 1966.
 Experience: I.B.M. operator, Allstate Insurance Company; salesman, Arts International, Detroit, Michigan.
- WILKS, MAURICE L. (1966)** **Architecture**
 B.Arch., Yale University, 1952.
 Experience: Private practice, Utah, California, Oregon; consultant architect for City of Hope Medical Center; project architect, Robert Kliegman and 20th Century-Fox, Century City Studios; project architect and senior designer, Victor Gruen Associates; design consultant, Chas. Matcham; designer, P. J. Ellerbroek and Westcott & Mapes; assistant professor, University of Kansas; associate professor, University of Utah. Registered architect, California, Ohio, Utah.
- WILLIAMS, ROBERT E. (1957)** **Architecture**
 B.S., California State Polytechnic College, 1954.
 Experience: Civil engineer-designer, California Division of Highways; civil engineer, Hornkohl Laboratories; President, Central Coast Laboratories. Registered engineer, California.
- WILLIAMSON, DANIEL P. (1970)** **Economics**
 B.A., University of California, Santa Barbara; Ph.D. candidate, University of California, San Diego.
 Experience: Associate in economics, University of California, San Diego; teaching assistant, University of California, San Diego; research assistant, University of California, San Diego.
- WILLIAMSON, DAVID G. (1968)** **Chemistry**
 B.A., University of Colorado, 1963; Ph.D., University of California at Los Angeles, 1966; postdoctoral fellow, National Research Council of Canada.
 Experience: Research assistant, University of California; chemist, National Bureau of Standards, Boulder, Colorado.
- WILLS, MAX THOMAS (1967)** **Chemistry**
 B.S., University of Puget Sound, 1961; Ph.D., University of Washington, 1965.
 Experience: Chemist, Oil and Refining Co.; laboratory technician, General Mills Inc.; teacher and research assistant, University of Washington; research chemist, Shell Development Co.

- WILLSON, IRWIN A. (1958)**.....Education
 B.A., University of North Dakota, 1930; M.A., University of Denver, 1940; additional graduate study, University of Denver, 1948-1958.
 Experience: Teacher, high schools, North and South Dakota; principal and director of elementary education, Canon City, Colorado; counselor, University of Denver; director of curriculum, Stanislaus County Schools, Modesto; superintendent of schools, Fall River Mills; assistant professor, San Diego State College; associate professor, chairman of the division of education and psychology, director of teacher education, Westmont College.
- WILSON, CHASE C. (1969)**.....Head, Agricultural Management Department
 B.S., Kansas State University, 1943; M.S., Wisconsin University, 1947; Ph.D., Missouri University, 1950.
 Experience: Field representative, American Jersey Cattle Club; professor, North Dakota State University; director of research, Dannen Mills, Inc.; vice president, Feed Division, Farmland Industries, Inc.; dairy farmer and manager; U.S. Navy.
- WILSON, HAROLD O. (1936, 1946)**.....Administrative Vice President
 B.S., University of California, 1932; graduate study, Fresno State College, University of California at Los Angeles.
 Experience: Director of agriculture, Excelsior Union High School, Norwalk; instructor of agriculture and head, swine department, California Polytechnic; regional supervisor, agricultural education, State Department of Education, California; dean, Voorhis Unit, California State Polytechnic College; Executive Dean, San Luis Obispo.
- WILSON, MALCOLM W. (1968)**.....Education
 B.A., Western State College, 1962; M.A., 1964.
 Experience: Teacher, Nucla Grade School, Colorado; Shenandoah Junior High, Miami-Dade Junior College; Canyon del Oro Junior High, Tucson; graduate assistant, instructor, University of Arizona.
- WILSON, WALTER D. (1969)**.....Physics
 B.S., University of California, Berkeley, 1957; Ph.D., 1966.
 Experience: Researcher, University of California, Berkeley; member of technical staff, Aerospace Corporation, San Bernardino, and Aerojet General Nucleonics, San Ramon, California.
- WINGER, DONLEY J. (1963)**.....Electronic Engineering
 B.S.E.E., University of North Dakota, 1960; M.S.E.E., 1963.
 Experience: Graduate assistant and instructor, University of North Dakota.
- WINNER, C. PAUL (1940)**.....Associate Dean, School Relations
 B.S., Montana State College, 1931.
 Experience: Director of vocational agriculture and critic teacher, Montana and California high schools; teacher trainer of agriculture education.
- WINSLOW, CARLETON MONROE, JR. (1969)**.....Architecture
 B. Arch., University of Southern California, 1947; M.A., University of Southern California, 1959.
 Experience: Private practice, California and Hawaii; associate professor of architecture, University of Southern California.
- WIRSHUP, ARTHUR D. (1952)**.....Mathematics
 B.S., City College of New York, 1931; M.A., Columbia University, 1936; M.S., Oregon State College, 1951; Ph.D., 1963.
 Experience: Teaching fellow in mathematics, Oregon State College; instructor, Multnomah College; radar officer, U.S. Army; National Science Foundation summer staff, Oregon State University.
- WOLCOTT, VICTOR F. (1962)**.....Business Administration
 B.S., Stanford University, 1947; M.B.A., 1949.
 Experience: Security analyst, Crocker First National Bank of San Francisco; financial analyst, Fibreboard Products, Inc., and Fibreboard Paper Products Corporation; extension instructor, University of California.

Faculty and Staff

- WOODWORTH, JOHN A. (1949)**.....Mathematics
A.B., Hastings College, 1939; M.S., University of Southern California, 1948; additional graduate study, University of California, Berkeley.
Experience: Teacher-principal, Nebraska schools; instructor, Baldwin Park, Salinas, Santa Ana Army Air Base; physicist, University of California Radiation Laboratory; principal, Hopland Union High School.
- WORK, LLOYD J. (1958)**.....Physics
B.S., California State Polytechnic College, 1954; M.E., Harvard University, 1967.
Experience: Metallurgical and ore dressing research, mill superintendent, International Metallurgical Chrome Corporation, San Luis Obispo; manager, Castro Mining Company, San Luis Obispo; U.S. Navy.
- WRIGHT, MARSHALL S., JR. (1960)**.....Chemistry
B.A., Reed College, 1946, 1952; M.A., University of Oregon, 1949; additional graduate study, University of California, University of the Pacific, University of Oregon.
Experience: Teaching fellow, University of Portland, University of Oregon; research and teaching assistant, University of California, and Institute for Metabolic Research; instructor, Orange Coast College, visiting lecturer, Chapman College.
- WU, SING-CHOU (1969)**.....Computer Science & Statistics
B.A., National Taiwan University, 1959; M.S., Utah State University, 1966; Ph.D., Colorado State University, 1970.
Experience: Teacher, Hwaling Commercial School, Taiwan, China; teller, Bank of China; laboratory instructor and programmer, Utah State University; teaching assistant, Colorado State University.
- WYSOCK, RAYMOND ANTHONY (1970)**.....Industrial Technology
B.S., California State Polytechnic, 1968; M.A., Fresno State College, 1969.
Experience: Production supervisor, The Neal Feay Co.; manager, Monrovia Blueprint Company; assistant engineer and draftsman, Nagle Pump Company; aircraft mechanic, Schneck Engine Service; apprentice welder, AMSCO Steel Company.
- YEH, CHUAN-SUNG (1970)**.....Electronic Engineering
B.S., Naval College of Technology, Taiwan, China, 1953; M.S., National Chiao-Tung University, Taiwan, 1964; M.E., McMaster University, Hamilton, Ontario, Canada, 1966; Ph.D., 1969.
Experience: Teaching assistant, McMaster University, Hamilton, Ontario, Canada; research fellow, Electronics Research Center, Chinese Naval Post-Graduate School, Taiwan; lecturer, Chinese Naval College of Technology, Taiwan; assistant engineer, First Navy Shipyard, Tsoying, Taiwan.
- YOUNG, CHESTER G. (1954)**.....Assistant to the President
A.B., San Diego State College, 1936; M.S., Stanford University, 1954; additional graduate study, University of California and San Jose State College.
Experience: Teacher and vice principal, Lemoore Elementary Schools; U.S. Navy; assistant professor, acting chairman, Mathematics Department, University of Santa Clara; instructor, mathematics, California State Polytechnic College.
- ZETZSCHE, JAMES B., JR. (1968)**.....Agricultural Engineering
B.S., Texas Technological College, 1962; M.S., 1967.
Experience: Research assistant engineer, Texas A & M University; instructor, agricultural engineering, Texas Technological College; instructor, agricultural mechanics, Sam Houston State Teachers College.
- ZILL, DENNIS G. (1970)**.....Mathematics
B.A., St. Mary's College, 1962; M.S., Iowa State University, 1964; Ph.D., 1967.
Experience: Teaching assistant, research assistant and instructor, Iowa State University; mathematician, Atomic Energy Commission, Iowa State University; assistant professor, Loras College, Dubuque, Iowa.
- ZUCHELLI, ED JOHN (1969)**.....Journalism
B.A., University of the Pacific, 1951.
Experience: President, KCOY-Radio, Santa Maria; vice president, Sales Manager and Director of Sports, KCOY-TV; KWG Radio; KJOY Radio; John R. McFadden Public Relations, KHJ-TV.

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CORRESPONDENCE DIRECTORY

For additional information on the following topics please address inquiries as follows:

APPLICATION FOR ADMISSION	Admissions Office
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ENTRANCE EXAMINATION	Test Officer
GRADUATE STUDY	Associate Dean, Graduate Studies
HEALTH SERVICES	Director, Health Services
HOUSING—RESIDENCE HALLS	Director, Housing
SCHOLARSHIPS AND LOANS	Financial Aid Counselor
STUDENT ACTIVITIES	Director, Activities
STUDENT EMPLOYMENT	Placement Office
SUMMER SESSIONS, EXTENSION	Admissions Office
TEACHING CREDENTIAL PROGRAMS	Education Department
VETERANS AFFAIRS	Registrar

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